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Annual General Meeting of the Arctic Circle

The Annual General Meeting of the Arctic Circle was held in the 1st. Corps Troops R.C.A.S.C. Mess, 278 Sparks Street, on Thursday 11 January 1951. The President, Mr. Frank Davies, was in the Chair.

Notice of an amendment to the Constitution had been given at the Twenty-fourth Meeting of the Arctic Circle on 14 December 1950 and this amendment was voted on and carried unanimously. The Secretary, Mr. T.H. Manning, then submitted the annual financial statement which was accepted. This was followed by a vote of thanks to the Auditors, Mr. W.K.W. Baldwin and Dr. George Hooper, who were re-appointed for the current year. Club membership had continued to increase and at the start of the fourth year of the Club's existence there were 172 Ottawa members and 256 out-of-town members, making a total of 428 as compared with 404 at the Annual General Meeting in 1950. The eight regular meetings during the past year were all well attended.

In accordance with the Constitution Mr. T.H. Manning, Secretary-Treasurer, and the following five members of the Committee resigned and were not eligible for re-election: F/L J.F. Drake, Mr. A.C. Jones, Mr. R.G. Madill, Mrs. T.H. Manning, and Mr. B.J. Woodruff. Dr. H.A. Procter also resigned from the Committee. To fill their places the Committee proposed the following names: Secretaries, S/L A. Copland and Mr. A. Stevenson; Treasurer, Mr. J. Cantley; Committee Members, Mr. Gordon Corcoran, Mr. T.H. Manning, Mr. Graham Rowley, Lt.-Col. G. Sangster, Mr. J.A. Wilson, and Mr. J.C. Wyatt. Previous to the Annual General Meeting the Secretary had received F/L S.E. Alexander's name as a nomination. With this addition the list proposed by the Committee was voted on and accepted unanimously. The Officers and Committee Members for 1951 are as follows:

President:	Mr. Frank Davies
Vice-President:	Insptr. Henry Larsen, R.C.M.P.
Secretaries:	S/L A. Copland, R.C.A.F.
	Mr. A. Stevenson
Treasurer:	Mr. J. Cantley
Editor:	Mrs. G.W. Rowley

Committee Members

F/L S.E. Alexander, R.C.A.F.
Mr. Gordon Corcoran
Dr. Y.O. Fortier
F/L K.R. Greenaway, R.C.A.F.
Dr. George Hooper
Mr. T.H. Manning
Mr. A.D. McLean
Major B.P. O'Connell
Mr. A.E. Porsild
Mr. G.W. Rowley
Lt.-Col. G. Sangster
Mr. F.C. Goulding Smith
Mr. J.A. Wilson
Mr. J.C. Wyatt

Business was concluded with a vote of thanks to Major J.R. Chisholm for the use of the R.C.A.S.C. Mess and to Major B. Tobin, Staff/Sgt. A.E. Wilde and Sgt. R.S. Pushman for making the arrangements at the Mess.

Major J.M. Berry then spoke on R.C.A.S.C. tractor train operations and showed a film of the R.C.A.S.C. tractor train to Ennadai Lake. An account of this work is included in this number of the Circular, immediately after the Amendment to the Constitution.

Amendment to the Constitution

At the Annual General Meeting a proposal for an amendment to the Constitution to permit the addition of a Treasurer and another Secretary to the Officers of the Club was moved by Mr. T.H. Manning and seconded by Mr. Frank Davies. This was carried unanimously and Paragraph 6 of the Constitution should now read:

"The officers of the club shall consist of

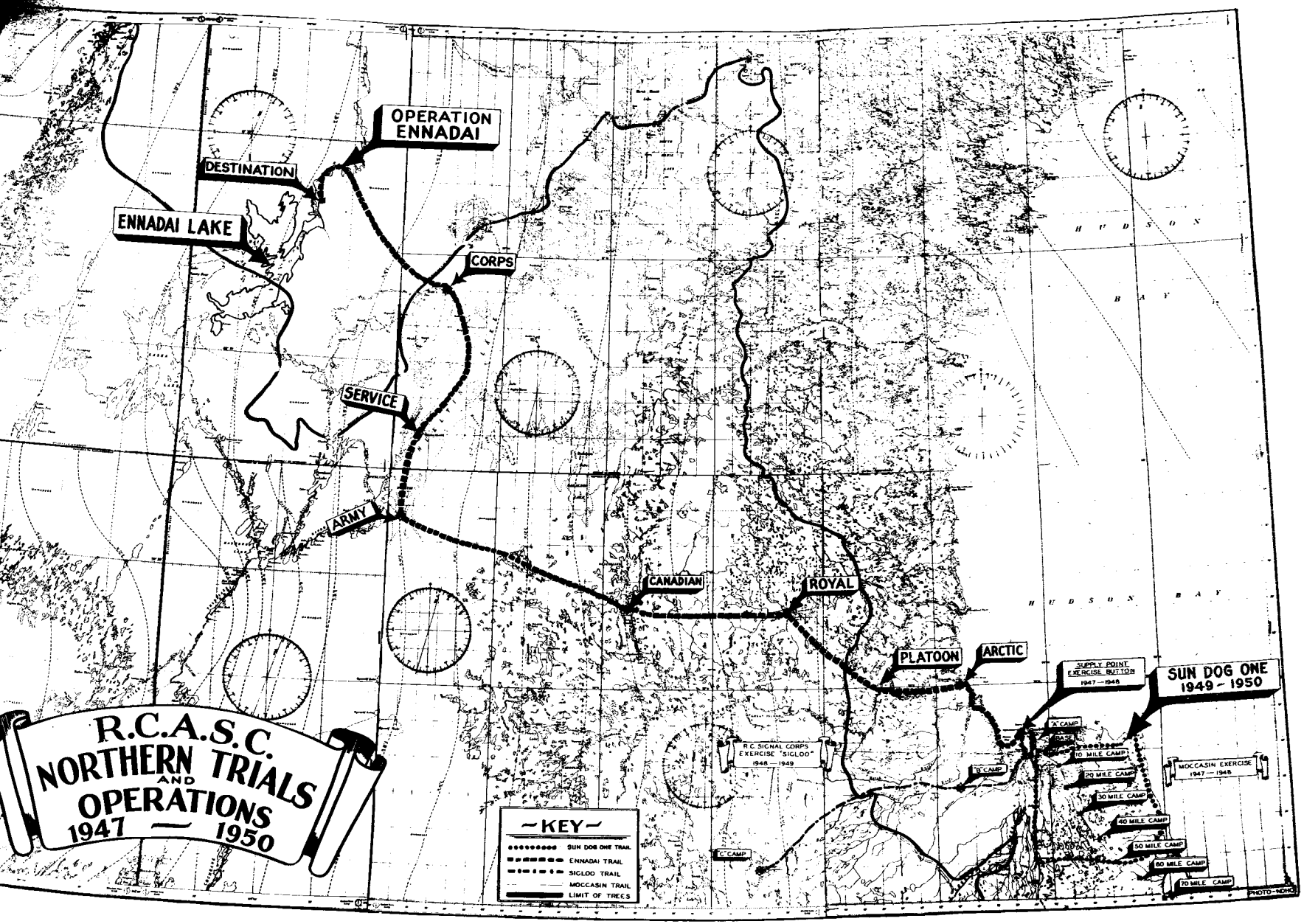
President
Vice-President
Secretary or Joint Secretaries
Treasurer
Editor of the Arctic Circular."

Royal Canadian Army Service Corps in northern trials and operations. By Major J.M. Berry

During the past three years, the Royal Canadian Army Service Corps has conducted trials and operations in northern Canada. As a result much useful information has been obtained on methods and equipment necessary for transporting and maintaining personnel and formations under northern winter conditions. An assortment of distinctly novel types of vehicles, including Penguins, Bombardiers, wannegans, and cargo sleighs, has been added to the family of Corps vehicles. It has been found necessary to alter the functional structure of the standard R.C.A.S.C. Transport Company and to include an Arctic Platoon.

Prior to the winter of 1947-8, maintenance and transport of all northern service operations had been carried out by light oversnow vehicles, supplemented in some cases by air supply. With the exception of two tractors making one trip from Churchill to Baker Lake during Exercise Musk Ox, no trials or operations had been conducted to determine the feasibility of using tractor trains in establishing a line of communication in northern winter conditions. It was fully realized that the methods being employed for ground maintenance of northern exercises and the types of vehicles being used at this time would be of little or no value if it became necessary to maintain a large force during northern operations. Such a force would be entirely dependent on air supply which would be controlled to a great extent by weather conditions.

In view of the obvious necessity of obtaining information on methods of ground maintenance and transport in northern winter operations, it was decided that the Royal Canadian Corps of Signals Exercise Moccasin, which was being carried out during the winter of 1947-8, should include the establishment of camps and test stations at intervals of ten miles, and the progressive movement and maintenance of these units to a distance of 76 miles southeast of Fort Churchill. Although considerable difficulty was encountered because of failures of test equipment, late deliveries of equipment from commercial firms, and inexperienced personnel, the exercise was conducted and maintained on schedule by R.C.A.S.C. tractor trains. Bad storms resulted in delay on the trail, but at no time was any movement of the stations or of supplies cancelled or postponed.


OPERATION ENNADAI
DESTINATION
ENNADAI LAKE
CORPS
SERVICE
ARMY
CANADIAN
ROYAL
PLATOON
ARCTIC
SUPPLY POINT EXERCISE "BUTTON" 1947 — 1948
SUN DOG ONE 1949 — 1950
R.C.A.S.C. NORTHERN TRIALS AND OPERATIONS 1947 — 1950
R.C. SIGNAL CORPS EXERCISE "SIGLOO" 1948 — 1949
MOCCASIN EXERCISE 1947 — 1948
A CAMP
BASE
10 MILE CAMP
20 MILE CAMP
30 MILE CAMP
40 MILE CAMP
50 MILE CAMP
60 MILE CAMP
70 MILE CAMP
B CAMP
C CAMP
~KEY~
SUN DOG ONE TRAIL
ENNADAI TRAIL
SIGLOO TRAIL
MOCCASIN TRAIL
LIMIT OF TREES
HUDSON BAY
PHOTO-NDHQ

Meanwhile other trials and tests were taking place. In order to maintain a five-day infantry exercise called Button, made in the Button Bay region, a supply point was established by tractor train in the area, and supplies and equipment were issued; the re-supply was carried out by tractor train from Fort Churchill. In addition ammunition for field artillery trials was moved, and general transport commitments, such as transportation of pre-fabricated buildings and stores, were carried out by tractor train in the Fort Churchill area.

The 1947-8 trials and exercises provided the Corps with a nucleus of trained personnel and proved that it was feasible to employ tractor trains in the establishment of a line of communication in northern winter operations. It was considered advisable to continue and advance the training of this specialist group and to expand tractor train operations during the winter of 1948-9.

In order to facilitate training and to permit the concentration of adequate tradesmen for larger exercises and operations, a new Arctic Platoon was added to 23 Transport Company R.C.A.S.C. and the company was given the responsibility of any R.C.A.S.C. northern operation. The Arctic Platoon is completely self-contained: welders, blacksmiths, carpenters, and diesel mechanics ensure repair and maintenance both at base and on the trail; cooks and clerks are also included, the latter to keep complete records and shipping vouchers for all stores and equipment transported. This platoon fitted in very well, as 23 Transport Company already had a standard transport platoon for the movement of stores and equipment from depots to railways or air terminals, and an air supply platoon for supply operations from rear or forward air heads and for the establishment of an emergency air supply unit at any base from which the tractor trains were operating. The re-organizing of the company was completed and all personnel of the 1947-8 trials team, with added R.C.A.S.C. and R.C.E.M.E. personnel who had been selected for 1948-9 winter operations, attended an extensive course on the maintenance and repair of tractors at the Caterpillar Tractor Company, Peoria, Illinois, U.S.A.

The R.C.A.S.C. Maintenance Detachment (tractor train) operating from Fort Churchill during the winter of 1948-9 was responsible for supply points for small exercises and the cross-country transport of stores and equipment such as had been carried out during the previous year. It also

had the additional responsibilities of the transport and maintenance of R.C. Signals Exercise Sigloo to a distance of 139 miles southwest of Fort Churchill, and the transporting of 266 tons of construction materials and equipment to Ennadai Lake, 470 miles northwest of Fort Churchill.

On Sigloo Exercise, the R.C.A.S.C. Detachment delivered rations, petrol, oils and lubricants, and mail on a fortnightly basis to signals stations established at distances varying from 8 to 139 miles southwest of Fort Churchill, and moved these stations as requested by the signals exercise director. No abnormal difficulties were encountered and all moves were made and all supplies were delivered on schedule for the period January 10 to April 4.

Operation Ennadai One was the real test of men and equipment and all training had been geared to this task, which was to be a very different proposition from supplying small exercises. Larger tonnages had to be transported greater distances, with a wider variety of terrain and weather conditions, than had ever been done by any known service tractor train. Repair and recovery work was a big problem. The selection of spare parts (it is impossible to carry all spare parts) was difficult. Since recovery of non-runners by base recovery units is considered impracticable at distances over 100 miles from base, each unit must be self-contained. The motto, "If you take it out make sure you can bring it back", is the password in all northern tractor train operations and the vehicle mechanics check and re-check equipment at every possible opportunity. The experience and information obtained during the 1947-8 trials again proved of great value. Spare parts kits for tractors and sleighs, survival kits, rations, fuel, clothing, and recovery equipment were issued to each train in accordance with scales established on these trials. Each tractor train consisted of a tractor, as prime mover; a wannegan (caboose) as living quarters for the personnel of the train; and anywhere from 2 to 6 load-carrying cargo sleighs, depending on the size of the prime mover. The trains were self-contained with the exception of some larger spare parts which it was not practicable to carry with the individual trains; these were carried by the last train, which also acted as a recovery unit. The sergeant vehicle mechanic and a recovery crew were allotted to this vehicle. For emergency air supply and evacuation the air supply platoon was established at Fort Churchill, where a Norseman aircraft was allotted by the R.C.A.F. for liaison duties and heavier types of aircraft were available on call.

One long-range wireless set was carried by the control wannegan for contact with base; the other trains were equipped with shorter range sets for communication with the control wannegan.

The original date for the start of the operation was January 9, but the freeze-up was late and ice conditions on the Churchill River were not considered satisfactory for heavy equipment. After four days, ice conditions had improved very little. However, further delay was undesirable, so the light trail breaker party, consisting of one D6 tractor, one 10-ton cargo sleigh, and a wannegan, was sent up the Churchill River to find a crossing and if possible to break the trail to Seal River since a check of ice conditions and a general report on the Seal River (which had been reported by the air observer as being still open) were urgently required. The trail breaker party was able to cross the Churchill River approximately 10 miles upstream and made the trip to Seal River, returning to Churchill on January 19 with the report that once across the Churchill the going was good to the Seal but there again it would be necessary to travel up the river in order to locate a satisfactory crossing. The operation was carried out by making two round trips to Ennadai Lake. The first swing of heavily laden tractors departed from Fort Churchill on 25 January 1949 for Ennadai Lake and returned on March 11, a total of 46 days for the round trip of approximately 940 miles. The second swing departed Fort Churchill on March 20 for Ennadai Lake and returned on April 17 (29 days). This trip caused much concern as civilian tractor operators considered it would not be possible to complete the round trip before the spring break-up, but the risk had to be accepted if the Ennadai Station was to be completed during the summer of 1949. It is worth noting here that once the tractor trail was established, the efficiency and the speed of the tractor train were increased and the turn around time was cut to almost one-half that of the original trip.

More than average mechanical difficulties were encountered with the tractors as none of them were new. The majority had been used on Engineer projects for a number of years, some had been used on airports and the grousers had been welded onto the track plates. This had removed the temper from the track plates and caused a very high rate of replacement. Here the air supply unit was called upon and 900 lbs. of spare parts were free-dropped from a Lancaster aircraft. Sleigh breakages were reasonably low but at one point a cargo sleigh loaded with 10 tons of

cement was turned on its side. The fact that this sleigh was righted, the front bob replaced and the top bunk of the rear bob replaced, without off-loading the cement, speaks well for the training and the high calibre of the personnel selected for the operation.

Repairs of all kinds were carried out on the trail. Two other major recoveries were made. One tractor, operating independently (the operator took a short cut), was recovered by using its winch cable through a snatch block attached to a deadman anchor in the ice. Two sleighs which had been overturned were recovered by using building jacks, three tractors equipped with winches, and one tractor equipped with a blade. Each of these operations took approximately 5 hours, some of the work being carried out during the period of darkness by the lights of the tractors.

The terrain crossed by the tractors included areas within the tree line; the barrens; sea, river, and lake ice; frozen muskeg; rocky ridges; sand ridges; and rock fields, which all contributed to provide a thorough test of both equipment and personnel. The lowest temperature encountered was -62°F., which was considerably lower than anything recorded at Fort Churchill during the same period. The wind chill experienced northwest of Lake Nueltin was extremely severe, and the wind seemed to blow almost consistently. There were numerous cases of frost bite among personnel operating or maintaining vehicles, although wind shelters of skins and tarpaulins were constructed for normal maintenance. When repairs were necessary the trains were drawn into a close circle around the vehicle being repaired, and the Herman Nelson heater was used, with one outlet blowing warm air onto the mechanic's hand while another outlet was directed toward the part of the vehicle being repaired.

Fresh rations were used almost exclusively. The only packaged rations carried were emergency rations, and fortunately were not required. Thirty days' supply and thirty days' reserve of fresh rations were carried frozen in open sleighs; at no time during the period of operation was any deterioration noted. Many of the operators became excellent cooks and soon learned that it was more convenient to carry bacon already sliced and roasts pre-cooked. They also learned that vegetables must be thawed and cooked in one process. Frozen eggs were found to remain fresh for long periods but the yolks remained solid when thawed. Only fresh fruits such as apples lost their appeal after freezing.

As a result of the successful completion of Ennadai One the Army Signal station at Ennadai Lake was completed and commenced operations during the summer of 1949.

The Signal station having been established, the next problem was the annual re-supply. This became one of the responsibilities of the R.C.A.S.C. Maintenance Detachment (tractor trains) during the winter of 1949-50, together with the infantry Exercise Sun Dog One.

Because of a much earlier freeze-up in 1949-50, northern winter operations and exercises were able to get started much earlier than in 1948-9. The re-supply of Ennadai Lake station was carried out in two trips and the operation was very similar to that of the previous year. The first swing of tractors left Fort Churchill on 28 December 1949 with a payload of 128 tons and the operation was completed on 25 March 1950. A total of 187 tons was transported and the last return trip to Fort Churchill was made in less than 7 days, an average of nearly 70 miles per day.

Mechanical difficulties with the tractors were minor during the 1949-50 operations as all tractors were new. Although the earlier freeze-up had proved an advantage in getting the operation off to an earlier start, much of the time gained was lost because of the shell ice, caused by the quick freeze-up, on the Caribou and other rivers. In many cases tractors dropped through the shell ice and many hours were lost in numerous recovery jobs and the many detours necessary. A Bombardier snowmobile was used as a liaison vehicle between the main swing and base. This vehicle proved invaluable on the established trail particularly in one instance when an operator was badly crushed between two wannegans during night operations, necessitating an emergency evacuation to base, a distance of over 100 miles. The Bombardier proved to be the ideal vehicle for this purpose because of its high speed and smooth riding and the evacuation was carried out in less than 5 hours. Unfortunately, it was not possible to complete the trials on this vehicle as it also became a victim of the shell ice. It dropped into a river, was damaged beyond any possible trail repair, and had to be loaded on a sleigh and returned to base.

Heavy snow also hampered and slowed the operation, causing a high percentage of breakage to sleighs and equipment. This was quite the reverse from the previous year's operation when in spite of lack of snow and the late freeze-up, the final conditions were good.

Meanwhile at Fort Churchill, Exercise Sun Dog One was carried out (see Arctic Circular Vol. III (1950) pp. 32-5) and infantry troops and supporting arms were transported and maintained to a distance of approximately 160 miles from base by R.C.A.S.C. Test Team. Although the route followed was within a short radius of base, the line of communication was set up and carried out in the same manner as it would have been if the exercise had been carried out to a distance of 160 miles from base.

Frequent user trials have been made and information has been obtained on types of wannegans, cargo sleighs, and oversnow vehicles required for northern winter operations. Logistical data have been accumulated from all exercises and operations completed to date, and a great deal has been learned about personnel requirements and operating procedures which will be invaluable if the R.C.A.S.C. is called upon to operate in defence of northern Canada.

All R.C.A.S.C. tractor train operations and exercises undertaken in northern Canada to date have been successfully completed, and it has been proved that it is feasible to use tractor trains to establish a line of communication in northern winter operations and exercises when ground supply is possible.

Geographical and archaeological investigations on Southampton Island, 1950. By J.B. Bird

During the past thirty years a number of archaeologists and physiographers have undertaken field work on Southampton Island, notably T. Mathiassen, T.H. Manning, and G.W. Rowley. In 1950 the Geographical Branch, Department of Mines and Technical Surveys, Ottawa, sent two small groups, acting together as one party for administration and supply, to the island. The members of the groups were W.D. Bell, archaeologist, J.B. Bird, M.B. Bird, and W.G. Dean, geographers. The main objects of the party were to examine certain problems of physical geography including the extent of the post-glacial marine submergence, the highest level reached by the sea, and its influence on the terrain; to investigate the relationship between Eskimo sites and raised shorelines, and to establish a relative chronology for the various Eskimo occupations of Southampton Island.

The party travelled to Churchill by rail and was flown to Coral Harbour, Southampton Island, by the R.C.A.F. early in June. For the first month travel on land was hindered by the rivers which were in flood and field work was restricted to the vicinity of the settlement. Short journeys were made by dog-team on the sea ice. One of these was to the mouth of the Kirchoffer River, and a survey was made from the estuary to a point five miles above the falls.

The sea ice was blown out of South Bay by a strong north wind on July 11, and both groups left Coral Harbour a week later by boat. It was originally intended that Bell and Dean would work on the Bell Peninsula for a month during which time J.B. and M.B. Bird were to survey along the east coast of the island. The groups then intended to join for a second month on the Roes Welcome coast. To achieve this object a Peterhead boat, the Akpa was chartered, with John Ell in charge and three other Eskimo for crew. The early work went well, one group moving from Prairie Point to Native Point and on to Expectation Point, the other group surveying north from a group of islands shown on the 8 Mile Map as McMurdo Point, to Cape Fisher, Mathiassen Brook, and Cape Comfort. Trouble was experienced with sea ice in Foxe Channel, the timetable became seriously behind-hand and finally on September 3, with Frozen Strait living up to its name, the party was forced to turn back for Coral Harbour without circumnavigating the island. The farthest point reached was Smyth Harbour, so named by Captain G. Back in 1836, and situated between Canyon River and Cape Comfort.

The highest level of marine submergence was determined to be between 550 and 600 feet above present sea level along the whole of the east coast. In addition, evidence of high pre- or inter-glacial sea levels was discovered. The archaeological sites on Bell Peninsula, particularly at Native Point, proved rich. Thule house ruins from 15 to 35 feet above high tide, and Dorset middens at 85 feet were excavated. The excavations suggest that a considerable interval of time separated the Dorset and Thule occupations of these sites, and that the Thule or Sadlermiut arrived relatively late on Southampton Island.

The island was at one time well populated by caribou but within fairly recent times the herds have disappeared and caribou are very scarce. One caribou was shot early in 1950 by an Eskimo and a number of fresh caribou tracks

were seen by the party in the hill country. Many polar bears were seen in late August and September but other mammal and bird life was relatively scarce on the east coast. Large numbers of arctic char were taken from the river estuaries.

The party reached Coral Harbour on September 19 after further trouble with sea ice and strong gales, and left the island by air towards the end of the month.

Eskimo Handicrafts

On 9 February 1951 Mr. James A. Houston, representing the Canadian Handicrafts Guild and the Northwest Territories Administration (see Arctic Circular Vol. III (1950) p. 54), left for Frobisher Bay, accompanied by his wife, a former teacher. After spending some time at Frobisher Bay, Mr. and Mrs. Houston plan to travel by dog-team to Lake Harbour and Cape Dorset. En route they will stay at the native camps for short periods of time, instructing the Eskimo of the district in handicrafts. They expect to remain at Cape Dorset until the arrival of the Eastern Arctic Patrol next summer. They will then join the Patrol and visit all the settlements on the northern and eastern Baffin Island coasts in order to study and encourage the handicraft industry in these areas.

Mr. Houston believes that the general level of Eskimo skill in handicrafts is reasonably good, although much of the material produced to date must be considered experimental. Ivory and soapstone carvings, beaded slippers, grass baskets, and ornaments are attracting a ready market in Canada and abroad.

The aim of Mr. Houston's work is not only to develop the recognized craftsman, but also to encourage the majority of the Eskimo to produce work which will be saleable. The sale of handicrafts if of direct financial benefit to the Eskimo and it is hoped that creating a new economic asset for the natives will improve the general Eskimo economy.

The French Antarctic Expedition

On 9 January 1951, the Commandant Charcot again reached Port Martin (60°50 S., 141°25 E.), Adélie Land and landed fourteen French scientists and an Australian

glaciologist. This group will continue the work of the French Antarctic expedition (see Arctic Circular Vol. III (1950) pp. 77-8) and will relieve the party of eleven which has just completed one winter in the Antarctic. Two members of the first wintering party will remain a second year. In addition to carrying out meteorological and hydrographic studies, the French scientists are exploring the hinterland of Adélie Land with dog-sleds and weasels.

Eastern Arctic Mailing List

The following list contains the names of white residents at all posts in the Eastern Arctic for which this information is available. Churchill has been omitted because of the many changes of personnel and large number of Department of Transport workers. D.O.T. personnel at the far northern weather stations have also been omitted. The list is not complete, but tries to show the residents at each of the posts listed in January 1951. The following abbreviations have been used: HBC, Hudson's Bay Company; M, meteorological personnel; R, radio personnel; RCMP, Royal Canadian Mounted Police; AM, Anglican missionary; RCM, Roman Catholic missionary.

Arctic Bay, N.W.T.

Boyd, A.S. (HBC)
Gardner, I.M. (HBC)(Post Manager)
Allaby, H.F. (M)
Benjamin, H.F. (M)
Fournier, J.E. (M) (cook)
Souder, F. (M)
Parsonson, C.H. (R)
Scotton, C.H. (R)

Baker Lake, N.W.T.

Lunan, A. (HBC)(Post Manager)
Mitchell, E.H. (HBC)
Atkinson, J. (M)
Chittenden, G. (M)
Erickson, R. (M)
Fraser, D. (M)
Legrow, Mr. & Mrs. (M)
Lippert, R. (M)
Porter, B.D. (M)
Westbrooke, J.J. (M)

Baker Lake, N.W.T. (cont'd)

Campbell, P.E. (R)
Lovell, T.M. (R)
Matys, A. (R)
McLeod, Mr. & Mrs. W.D. (R)
Simpson, A.A. (R)
Summers, R.J. (R) (cook)
Woodhouse, K.A. (R)
Milmine, 2/Cst. R.N. (RCMP)
Ripley, Cst. W.A. (RCMP)
James, Rev. W.J.R. (AM)
Buliard, Rev. Fr. J. (RCM)
Choque, Rev. Fr. C. (RCM)
Choque, Rev. Fr. J. (RCM)

Cape Dorset, N.W.T.

Griffiths, Mr. & Mrs. R.T. (HBC)
(Post Manager)
Pelletier, Rev. Fr. J.E. (RCM)
Trebaol, Rev. Fr. J.M. (RCM)
Trinel, Rev. Fr. E. (RCM)
Applewhite, Mr. & Mrs. A.F.
(Teacher and Nurse)

Cape Hopes Advance, Que.

Cole, F.J. (R)
Emeneau, F.F. (R)
Riley, A.J. (R) (cook)
Thornhill, L.G. (R)

Cape Smith, N.W.T.

Knight, Mr. & Mrs. R.E. (HBC)
(Post Manager)

Chesterfield Inlet, N.W.T.

Brownie, W.C. (HBC)(Post Manager)
Alto, R.R. (R) & Mrs. R.R. (cook)
Green, H.B. (R)
Hoshal, G.M. (R)
Howie, W. (R)
Davies, Cpl. J.H. (RCMP)
Bélair, Rev. Fr. R. (RCM)
Ducharme, Rev. Fr. L. (RCM)
Sassard, Rev. Fr. E. (RCM)
Corbett, Dr. P. (Indian Health)

Clyde River, N.W.T.

Murdoch, P.E. (HBC)(Post Manager)
Baker, R.H. (M)
Donaldson, B.W. (M)
McCabe, H.J. (M)
Plourde, R.L. (M) (cook)
Young, M.G. (M)
Dotzenroth, G.E. (R)
Elliott, W.J. (R)

Coral Harbour, N.W.T.

Matheson, D.C. (HBC)
Swaffield, A.T. (HBC)(Post Manager)
Parker, G. (M)
Ward, W.E. (M)
Barber, J.E. (R)
Clemow, H. (R) (cook)
Earl, L.K. (R)
Penner, R.Y. (R)
Robson, G.K. (R)

Coral Harbour, N.W.T. (cont'd)

Southall, P. (R)
Thiel, W.W. (R)
Rio, Rev. Fr. M. (RCM)
Copeland, Mr. & Mrs. W.H.
(Teacher and Nurse)

Dundas Harbour, N.W.T.

Barr, Cst. G.C. (RCMP)
Wright, Cst. D.J. (RCMP)

Eskimo Point, N.W.T.

Rennie, G.M. (HBC)
Russell, C. (HBC)(Post Manager)
Carey, Cpl. W.L. (RCMP)
Berube, Rev. Fr. S. (RCM)
Dionne, Rev. Fr. H.P. (RCM)

Fort Chimo, Que.

Fairies, W.R. (HBC)
Milligan, P.M. (HBC)
Wright, P.M. (HBC)(Post Manager)
Archambault, R.R. (M)
Bourdon, E.C. (M)
Demery, W.R. (M) (cook)
Drouin, C.A. (M)
Grandy, O.C. (M)
Martel, E.E. (M)
Irwin, M.J.R. (R)
Labelle, J.E.N. (R)
Simpson, G. (R) (cook)
Smith, J.B. (R)
Torraville, R.D. (R)
Wilhelm, I.E. (R)
McRae, Cst. A.K. (RCMP)
Jacobs, Rev. Fr. J. (RCM)
Emond, Mr. & Mrs. K. (Teacher
and Nurse)

Fort George, Que.

Thorburn, Mr. & Mrs. A.P.
(HBC)(Post Manager)
Shepherd, Rev. Canon & Mrs.
H.S. (AM)

Fort McKenzie, Que.

Brunet, J.R.J. (M)
Lebel, J.G.N. (M)
Piche, J.E.E. (M) (cook)
Roy, J.P. (M)

Frobisher Bay, N.W.T.

Powell, D. (HBC)
Tolboom, Mr. & Mrs. W.A. (HBC)
(Post Manager)
Lafranchise, J.L. (M)
Parker, M.N. (M)
Walsh, D.H. (M)
White, G.D. (M)
Crump, C. (R)
Higman, S.L. (R)
Levy, E.G. (R)
Rennie, C.R. (R)
Ritcy, D.B. (R)
Sadler, W.E.A. (R)
Johnson, Cst. H.A. (RCMP)

George River, Que.

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(Post Manager)

Great Whale River, Que.

Jeffrey, R. (HBC)(Post Manager)
Woodrow, F.J. (R)
Nielson, Rev. G. (AM)

Igloolik, N.W.T.

Payne, A. (HBC)
Ploughman, R.H. (HBC)(Post Manager)
Mary-Rousseliere, Rev. Fr. G. (RCM)

Indian House Lake, Que.

Beattie, R.I. (R)
Descoteaux, J.R. (R)
Frechette, R. (R)
Saunder, I. (R)
Shand, C.E. (R)
Theriault, P. (R)

Ivugivik, Que.

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Verspeck, Rev. Fr. L. (RCM)

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Nottingham Island, N.W.T.

Beveridge, G.A. (R)
Carr, D.F. (R)
Newell, R.E. (R) (cook)
Weir, T.A. (R)
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The Club meets in Ottawa once a month during the winter. The meetings are informal and feature a lecture on some subject of general interest to the members.

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Editorial Note

The Editor would welcome contributions from those who are at present in the Arctic or have information about work in the Arctic. All material for the Circular should be sent to:

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Editor Arctic Circular,
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THE ARCTIC CIRCULAR

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Twenty-sixth Meeting of the Arctic Circle

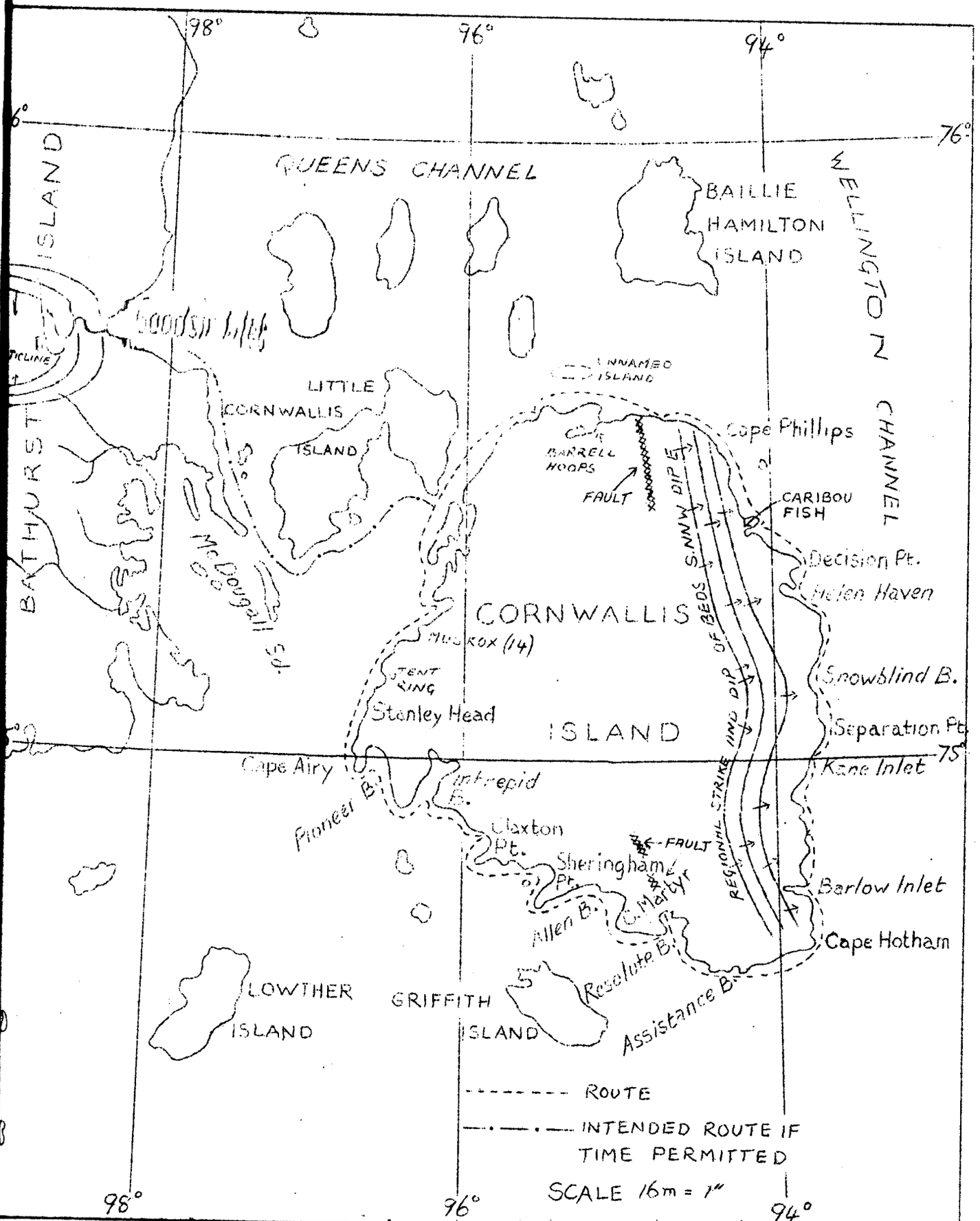
The Twenty-sixth Meeting of the Arctic Circle was held in the 1st. Corps Troops R.C.A.S.C. Mess, 278 Sparks Street, on Thursday February 8.

The President, Mr. Frank Davies, was in the Chair and introduced the speaker, F/L K.R. Greenaway. F/L Greenaway spoke on "Navigating in the Polar Regions", and illustrated his talk with slides.

Voyage round Cornwallis Island. By Trevor Harwood

Since the war, the Geological Survey has undertaken a programme of reconnaissance mapping of the Northwest Territories. For the purpose of this programme the area has been divided into two parts; work on the Arctic mainland is directed by Dr. C.S. Lord, and on the Arctic Islands by Dr. Y.O. Fortier.

It was planned that the mapping of the Arctic Islands would begin in the eastern islands and would progress northwestward to the Arctic Ocean. Prior to the summer of 1950 Dr. Fortier had carried out geological work in southern Baffin Island and had made reconnaissance studies in Victoria and King William islands. In 1950 he decided to map the geology of Cornwallis Island. The chief problem was that of transportation. As a helicopter was out of the question at the time, the choice lay between a boat or a canoe. A number of experts advised against the idea of water transport, saying that ice conditions were such that the use of small craft would be impossible. However, Dr. Fortier was unwilling to accept this, and with the encouragement of myself and others we decided to circumnavigate the island in a 22-foot freight canoe with a 5 H.P. outboard.


98°
96°
94°
76°
QUEENS CHANNEL
BAILLIE HAMILTON ISLAND
WELLINGTON CHANNEL
BATHURST ISLAND
Goodsir Inlet
ANTICLINE
LITTLE CORNWALLIS ISLAND
INNAMEE ISLAND
Cape Phillips
BARRELL HOOPS
FAULT
CARIBOU FISH
Decision Pt.
Helen Haven
McDougall Sd.
CORNWALLIS
MUSKOX (14)
TENT RING
Stanley Head
ISLAND
Snowblind B.
Separation Pt.
75°
Kane Inlet
Cape Airy
Pioneer B.
Intrepid B.
Claxton Pt.
Sheringham Pt.
FAULT
Cape Marlyr
Allen B.
Barlow Inlet
Cape Hotham
Resolute B.
LOWTHER ISLAND
GRIFFITH ISLAND
Assistance B.
S.NNW DIP OF BEDS
REGIONAL STRIKE AND DIP
ROUTE
INTENDED ROUTE IF TIME PERMITTED
SCALE 16m = 1"

Through the courtesy of the R.C.A.F. the party of three men, Dr. Y.O. Fortier and R. Thorsteinson, both of the Department of Mines and Technical Surveys, and myself, were flown in to Resolute. The Air Force went to considerable trouble, because the transport of a 22-foot canoe, even in these days, is not an easy problem. The canoe was finally lashed into the bomb-bay of a Lancaster aircraft, and a reasonably comfortable trip was made to Resolute.

Our party arrived on June 1, and although spring was well advanced and open water was visible fifteen miles away in Lancaster Sound, we had to wait until July 17 to complete our final preparations for departure. The interval was filled in by a detailed survey of the Resolute area and in running several minor surveys for the various groups at the weather station.

On July 15 a very strong northeasterly gale, accompanied by snow and sleet, commenced and lasted three and a half days. It was apparent that this heavy wind would clear the eastern approaches to Cornwallis Island and our party prepared to set out as soon as the gale abated. By early morning of July 21 we could be reasonably certain of at least one calm day. The canoe was therefore loaded, in fact overloaded, with 115 gallons of fuels, 1,500 pounds of food, and 1,500 pounds of personal and technical equipment. This outfit was intended to last us until September 20, with an ample margin of safety. At last, at noon on July 21, we departed from Resolute Bay eastward.

The sea was fortunately flat calm, and an easy run was made to Assistance Bay where a stop was made for lunch. The ships of Captain Penny and of Sir John Ross spent the winter of 1850-1 in this bay, and traces of their stay, including piles of tin cans and the remains of a blacksmith's shop, could be seen on the eastern shore. Here, for lunch, we started our diet of K rations. These rations, although perhaps monotonous for long periods, turned out to be ideal for lunches and emergency snacks. After a cursory examination of the rocks in this vicinity, a start was once more made, and by 6 p.m. we had rounded Cape Hotham at the southeast corner of the island. The cape, which in the early evening light was a most impressive sight, is formed by a bold bluff of limestone beds dipping 45 degrees eastward into the sea. A large landslide had occurred on the point and Thorsteinson, who had seen the slide at Frank, Alberta, considered that the slide here was quite as large.

From Cape Hotham, as far as the eye could see, the coast stretched northward, bold and forbidding, while Wellington Channel, which had been closed with ice two weeks earlier, now appeared to be entirely open. A little later, as we moved north, the wind freshened from the south, and it was with some relief that we reached the shelter of Barlow Inlet.

Our first night's camp proved entirely satisfactory, although the weather rapidly deteriorated during the evening culminating in a strong southwesterly gale. The large 14-x 16-foot tent of heavy canvas allowed us to stow everything out of the rain and sleet and yet left sufficient room for sleeping and cooking. It cannot be too strongly emphasized that the largest and strongest shelter, consistent with weight and space considerations, should always be taken on journeys such as this one. July 22 and 23 were spent in obtaining a geological section of Barlow Inlet. In addition a geological reconnaissance was made some 10 to 15 miles inland, collections were made of the flora of the region, and soundingswere taken in the inlet.

July 26 saw us clear of Barlow Inlet and literally fighting our way up the coast. A long swell and strong current coming down Wellington Channel made the points of land extremely difficult to work around with the overloaded canoe, and it was only by keeping very close to the shore, with constant bailing, that we could make any headway at all.

At several places between Kane Inlet and Barlow Inlet a number of small streams break through to the sea. The majority of these build up spits on the coast and small lagoons are usually formed within the spits. We spent the nights of July 27 and 28 inside one of these lagoons. Here a geological section and traverse were completed, which in all took two more days.

After another southeast gale, which died out on the evening of the 29th, we moved on up the coast to Kane Inlet, which we found to be approximately seven miles north and four miles east of the position given on the map. A few miles south of this inlet the aspect of the country changed entirely. The high bluffs recede from the coast and the vegetation, sparse though it still is, becomes much more abundant, presumably because of the change in geological formation - the limestones and dolomites giving place to sandy shales and conglomerates. These appear to have weathered to a thin soil which supported a reasonably

abundant vegetation for the climate. There were many musk ox and caribou tracks, though we did not see any of these animals. Many hares were seen feeding on the grassy slopes around the inlet. Numerous white whales came into the inlet during the following days and jar and bearded seal were plentiful. The whales appeared to be playing and frolicking, rolling over on their backs and jumping out of the water.

On completion of our work in this inlet, we were once more delayed several days by high northwesterly winds. Tremendous ice sheets were seen coming down from the north, no doubt from the edge of fast ice at the head of Wellington Channel. These pressed against the east coast of the island, making navigation impossible. The movement of this ice mass, which extended some 10 miles offshore, was always rapid. The combined wind and current hurried it southward at about one to two miles an hour. We noticed that the current coming down from the north swung in and round the northern side of the bay emptying along the south side. Ice floes were often observed entering the bay with the current, making their way to its head against the wind, crossing, and returning along the south side to Wellington Channel.

By August 4 the ice had loosened up somewhat around Separation Point and the wind had dropped, shifting to south-west. In great haste we made a start to take advantage of this opportunity. With some difficulty we worked our way through the grounded ice, but had made little progress before the rising wind and sea once more forced us ashore. After a short stop during which we ate our lunch the wind dropped sufficiently for another attempt. At very slow speed, and taking advantage of all the shelter the heavy shorebound ice afforded, we managed to reach the northern side of Snowblind Bay and camped there for a few hours. Our movements were, in fact, so slow and cautious, and so loud was the noise of the sea on the ice, that we were able to surprise a bear asleep on a floe. His look of astonishment was extremely funny. Midnight, after a fairly easy run to the north from Snowblind Bay, put us in Helen Haven, a long inlet with an extremely shallow entrance.

The topography of the country here is even more subdued than around Kane Inlet, with low rounded hills sloping to the sea. The shales and conglomerates which predominated farther south were replaced by dolomites and limestones. The entrance to the bay was extremely shallow, the canoe nearly grounding several times, while farther inside, the previous winter's ice was still gently moving to and fro with the wind and the tide. A large number of bearded seal could be seen on the ice.

Our usual routine was carried out here, of geological traverses, observations for position, and measurements of the heights of raised beaches and of the height of land. A large collection of fossils was also made.

Walking along the beach near Decision Point, Fortier found a small canister just above the high-tide mark. It had been damaged by .22 bullets or what may have been .303 bullets. On opening it he discovered messages wrapped in a portion of the Evening Mail of 17 to 20 May 1850. Since the paper was very brittle the documents were not fully opened out, but the still legible signature of Dr. R.H. Goodsir could be seen.

It was at Decision Point that Captain Penny decided to cross Wellington Channel with his larger sledge party, sending Dr. Goodsir and Mr. Marshall northward along the coast of Cornwallis Island. Our little discovery gave us a sense of accomplishment and a keen respect for those men who, with none of the present day facilities, achieved so much.

The morning of August 6 broke clear and without a breath of wind, so not wishing to lose one of the very few calm days that had come our way, we packed and moved. It goes without saying that the wind immediately arose again, once more from the northeast, and drove us ashore in a little harbour formed by another spit. At this place a river wended its way to the sea from a large lake. We caught some very fine Arctic char in a gill net in this stream, which were indeed a welcome change from canned food.

Late that evening we saw two caribou grazing near the lake. These were so tame that we could approach within twenty-five feet without alarming them, and we obtained several good photographs. Dr. Goodsir mentions seeing a caribou and numerous tracks in this same place. The scarcity of vegetation on the island probably forces this small herd to remain in one place.

Two days later, on August 8, we moved on. This move carried us well round the northeastern end of the island to a small bay near Cape Stewart. On the way to this camp we saw an overturned boat on the beach, some twelve miles north of "Salmon River". This must have been the boat left by Captain Penny in Abandon Bay on his return from Cape Becher in 1851. The craft was a standard Royal Navy whale-boat, which seems to have changed little if at all over the century; the present day whale-boat in the

Navy is identical except for the addition of a centreboard. There were no marks on the bow or the stern to identify the builder or the dockyard from which it had been drawn. Oars, boathook, rifles, bread boxes, spirit jars, chisels, hammers, sheath knives, and other articles were strewn round the wreckage. The oars and boathook were so well preserved that they could have been used once more if necessary, and in fact the boathook was taken by us as a staff for the W/T aerial.

A few miles farther on we surprised another bear which was eating the remains of a musk ox on the shore beneath the cliff. Since the musk ox appeared to have been dead for a considerable time it was doubtful that it had been killed by the bear, but had probably died as the result of starvation and old age during the previous winter.

About 3 a.m. the same morning we found a campsite after some difficulty but, as the following days were to show, it proved to be a very poor choice indeed. From August 10 to 17, one full week, a succession of south-westerly gales, which every evening veered to the north, accompanied by rain, snow, and freezing temperatures, made life miserable. Fortunately the tent withstood the wind, although we were nearly flooded when the high spring tide came to within a few inches of the tent floor. We would certainly have been washed away but for the fact that the heavy ice moved in towards the beach with the rising tide, giving a little shelter from the heavy seas running in from the north.

A most interesting collection of graptolites was made from the shales between our campsite and Cape Phillips. Evidence of thrust from the west and high angle thrust faulting could be seen in the cliffs facing Queens Channel. Samples of bitumen from a basal conglomerate were also collected and evidence of an oil seepage along the fault was noted.

During our stay here another bear evinced considerable interest in the camp, and while he did no damage, he caused considerable concern for at times he would persist in coming within a few feet of the tent. Fortunately, for him, he generally contented himself with sitting quietly about 200 yards away and looking at the orange tent and red jerry cans which obviously provoked his interest. The wind finally blew out on August 15 and we once again continued our geological work.

This area was extremely interesting, showing considerable faulting and a little mineralization (zinc), but we could not afford to tarry very much longer, particularly since Fortier had been requested to return to Ottawa by August 20. Furthermore, the weather had deteriorated and the freeze-up did not seem to be far distant. No longer did we have rain showers, snowflurries had taken their place, and the highlands everywhere had a coating of snow which did not disappear during the daytime. For this reason we pushed on as fast as we could leaving this inhospitable campsite on the morning of August 17.

The morning of our departure was extremely cold with freezing temperatures and snow and heavy ice were moving rapidly to the east through Queens Channel. Despite the continual snow squalls and ice which had hung up on all the points, we made sufficient mileage to be able to camp late that evening somewhere near the west end of the island. While we were setting up the camp a young fox was attracted to the camp and once more we were astonished to see how tame these animals were on first meeting human beings.

This night there was a succession of very high wind squalls from the north accompanied by heavy snow. Fortunately, when morning broke, the clouds disappeared and the wind fell allowing us to move on. However, the next few hours were bewildering. This section of the island is extremely low and the shore is everywhere fronted by beaches and tidal lagoons. Fortunately the shallow water again proved our salvation since the very heavy polar ice grounded a mile or so off the beach leaving a stretch of ice-filled navigable water between the coast and the pack. It was through this that we made our way along the shore. We finally found the northwestern corner of the island, after wondering for some time whether we would recognize it. Several times we thought we had lost ourselves because of the difficulty of identifying features shown on the aerial photographs. However, when we did reach the corner there could be no doubt that it was the northwest end of the island, for the strait between Cornwallis and Little Cornwallis lay open and clear to the south. As far as we know, we were the first to see this strait from the sea, and the first party to go through the strait and explore the west coast of Cornwallis Island.

The strait itself was oily calm and free of ice and we made good time until we reached the southern entrance. Here heavy ice from Viscount Melville Sound and McDougall Sound had rafted all along the shore and blocked the channel, with the result that we were forced to wait

for several hours until the tide turned.

Once clear of this new strait the voyage down the sound was not too difficult, and early morning saw us nearly half the distance to Cape Airy. Inside a little river, not far from Stanley Head, which flowed into an unnamed bay, we finally anchored the canoe and camped. This little stream drained a number of lakes on a low foreland fronting a higher hill.

At last we were fairly confident that we would manage to circle the island without mishap, and at this stage we still had 60 gallons of gasoline, enough for 300 miles, and at least 60 days food. Thus, if time had permitted, it would have been entirely feasible to have reached our minor goal, Bathurst Island, where we had intended to examine the very large anticline which plunges west from Goodsir Inlet.

Early morning found Thorsteinson at his favourite occupation, examining the hills through field-glasses. This time he was a little luckier than usual, for a few miles to the west he saw a large herd of musk oxen peacefully grazing on the low lying land near the lakes. This, of course, to Thorsteinson, was the climax of the journey, and all of us took the opportunity to take a large number of photographs of the herd.

These musk oxen were extremely tame, like every other animal we had so far encountered, and allowed us to approach several times to within ten feet. However, one old bull, who up to this time had patiently manoeuvered his charges against this novel menace, finally took umbrage and charged the writer while he was lying on the ground attempting to obtain a photograph of the herd against the sky. By good fortune I was able to roll clear of the animal and in the end both of us stood breathing heavily and eyeing each other about five feet apart. The animal finally backed into the herd but not before a couple of excellent exposures were obtained.

As we turned to leave, the oldest bull threw out the two younger bulls as flank guards and the whole herd galloped away at a speed which we considered to be at least 15 to 20 miles an hour. It is quite certain that had any of the party realized that these animals were so fleet not one of us would have dared to come within 100 yards of the herd.

This photographic orgy completed, some seventy exposures having been made, we struck camp and moved out of the bay towards the open sea. Bathurst Island, with its peculiar cone peak, remarked upon by Parry on his first voyage, shimmered whitely on the western horizon. There could be no doubt that winter had commenced. The sound was again calm and a quick passage was made through the broken ice. Just before we reached the southwestern tip of the island heavy fog began to roll in. This did not cause any delay and by keeping very close in to the shore we were able to round the tip of the island and circle Pioneer Bay in the falling light. At this time, despite careful lookout, we could find no decent campsite and after several hours of searching we finally hauled into a small lagoon to hold a conference. With the aid of several heavy tots of medicinal rum, accompanied by sweet hot tea, our spirits were rapidly resurrected. It was with some abandon that we once again set off; the fog seemed to have lifted and the air certainly felt warmer, but it is doubtful whether this was entirely due to a change in the weather. A crossing was made of Intrepid Bay and a small cove was discovered where we anchored and camped for the night.

Early the next morning all of us noted a very strong smell of natural gas, and since the night had been calm we thought that a seepage nearby had allowed a pocket of gas to accumulate near the tent. Search for this seepage proved futile.

Despite what later proved to be a very strong southeast wind we left Intrepid Bay and bucked our way along the coast as far as Claxton Point. This point, made by a long narrow ridge of hard dolomite extending some two miles southward into the strait, looks much like a man-made breakwater. Behind this shelter we were forced to lie up until late in the afternoon when we had to decide that we were to be windbound for some hours. We therefore retreated into a small cove some way back from the point and settled down to what we hoped was our last night out.

August 21 saw us impatiently waiting for the wind to die and the sea to become calm enough to allow us to continue. We got on our way at 4 p.m. and, as might well be expected, the wind picked up again at about 6 p.m., blowing strongly offshore from the north. This made progress from Sheringham Point across the western end of Allen Bay difficult and even hazardous. Even more anxiety was caused by the alarming discovery that we had

inadvertently found our way into a large walrus herd. These animals, about 120 in all, persisted in following the canoe for some distance. After a few worrying minutes, we made shore on a small island only to discover, mainly by the use of our nostrils, that we had landed on their breeding ground. By now they had become most inquisitive and what was worse, appeared to be highly irritated, for with angry snorts they were raising themselves two and three feet clear of the water and several actually made timid attempts to climb onto the beach. Since it was impossible to stay here all night we decided to push on; by keeping in very shallow water near the island and finally scurrying across to the mainland, we managed to break away. The wind was rising, making travel miserable. But for the fact that the buildings of the weather station at Resolute were already in sight we would probably have holed up for the night.

However, temptation proved too strong and we coasted the shore of Allen Bay, reaching the open sea once more near Cape Martyr. From Cape Martyr to the western point of Resolute Bay the coast is entirely open and a light swell had already commenced to run from the east down Wellington Channel. A little to the east of Cape Martyr this swell caused the only damage to the canoe on the trip. In our desperate attempts to keep close to the shore to gain its lee we were caught by one swell larger than the rest which let the canoe down on to the rocky bottom, punching a small hole through the canvas.

On August 22 at 2.30 a.m. we turned into Resolute Bay, and by 3 a.m. the canoe was completely unloaded and we were all enjoying the early morning delights of Resolute night life.

Next day our party broke up. Fortier and Thorsteinson returned to the south via Greenland while I remained for a few more days to pack up, finally reaching Ottawa on the morning of September 10.

The trip yielded two important findings: the first being that the stratigraphy of the Arctic Islands is not nearly as simple as previously pictured by early geologists. Mountain building appears to have taken place and it would seem likely that here we may have something very similar to the Appalachian geosyncline in structure. This will have to be proven by subsequent workers. The second is that it now appears to be quite feasible to use a freight canoe in the southern parts of these islands and that it is probably the most suitable craft for this type of work.

All our party more or less agreed that local concentration of oil or gas might exist if suitable structures could be found, but in view of the very large dips seen at various points throughout the journey these concentrations would probably tend to be highly localized and difficult to discover.

The discovery of Prince Charles Island

We have received permission from Captain W.A. Poole to publish his account of the discovery of Prince Charles Island, in eastern Foxe Basin. At the time Captain Poole was in command of the C.G.S. Ocean Eagle. This account was written in 1932 and has not hitherto been published, though the discovery was recorded in the log of the Ocean Eagle [1], and a map showing the probable extent of the new land was left in the Harbour Master's Office at Churchill. Accounts of the sighting of Prince Charles, Foley, and Air Force islands by a R.C.A.F. photographic aircraft in 1948 and of the Geographical Bureau's expedition to these islands in 1949 have been published in the Circular (Vol. I (1948) pp. 73-5 and Vol. 3 (1950) pp. 26-31). The Geographical Bureau expedition, led by Mr. T.H. Manning, travelled in the Nauja, a peterhead boat, and spent eighteen days exploring the islands. On 14 August 1949 the party landed near the southwest point of Prince Charles Island and then followed round the southeast, east, and north coasts to the northwest point. The west coast, the only coast not surveyed by this expedition, is that first sighted by Captain Poole and is described by him in the following account:

During September and October of 1931, and August and September of 1932, I was sent with the C.G.S. Ocean Eagle north from Hudson Bay into Foxe Channel and Foxe Basin to study the occurrence and motion of ice floes.

In 1931 we were stopped by pack ice, completely blocking Foxe Channel at about latitude 66°25 N. In 1932, however, though occasional ice floes were sighted from 63°30 N. northward, there was no difficulty in sailing through to Foxe Basin - apparently the first steamship to enter these waters. Because of fog and the lack of adequate charts, it was necessary to proceed with caution. However with frequent soundings we went as far as 68°10 N., 80°50 W., and then along the edge of a large ice floe to 67°47 N., 78°00 W. Both of the Spicer Islands were sighted close to the position (68°00 N., 78°40 W.) indicated on the chart.

Steaming farther to the southeast, other land was sighted. We anchored about four miles offshore until we were able to determine our position (67°47 N., 77°28 W.) with precision. From this position the land appeared as a low, barren waste. It had the scoured appearance typical of the arctic glacial country, though no ice or snow was visible. Boulders were on the hills and lined the gently sloping shore. The shoreline was nearly straight, extending at least fifteen miles both to the north-northeast and the south-southwest.

Ice prevented us from going northward, and on steaming southward we were enveloped in the fog. Lack of coal then made it necessary to return before the land could be surveyed further. It was however found that the land does not extend southward as far as latitude 67°18 N. at longitudes west of 76°20 W.

I can find no record of the west shore of Baffin Island having been visited in these latitudes by sea. It is thus not impossible that the land we sighted is a peninsula extending into Foxe Basin from the mainland of Baffin Island. It seems much more probable, however, that it is an island of roughly the dimensions indicated on the map.[2]

The land was first sighted by Mr. Charles P. Rendell, mate, on September 2. Professor A.H. Compton [who had gone north with the Ocean Eagle to make cosmic ray observations] assisted in checking the position. The voyage was made under the direction of Mr. George Kydd, Resident Engineer, for the Department of Railways and Canals.

Churchill, Man.,
10 September 1932.

1 "Navigation conditions in Hudson Bay and Strait during the Season of Navigation 1932", Department of Marine, 1933, p. 36.

2 Placed in the Harbour Master's Office at Churchill.

The Arctic and the Specialist Navigation Course.

By F/L G.J. Sweanor

The Air Navigation School of the R.C.A.F. at Summerside, P.E.I. is currently conducting four types of navigation courses: the basic courses training students up to wings standard; the "SNIN" courses which train experienced navigators to become instructors and to hold executive

squadron positions; the "SNIP" courses which train pilots in navigation; and the Specialist Navigation (Spec N) course which is designed to prepare experienced navigators for senior staff positions. While all courses study the problems of arctic navigation and simulate them on local flights, only the "Spec N" course includes actual flying in the Arctic.

The "Spec N" course lasts seven months and usually starts in October. After an initial period of classes, the course makes a 10-day visit in December to such Canadian establishments as the National Research Council laboratories, the Dunlap Observatory, the University of Toronto, and various aircraft factories and map-making firms. Later, when the thermometer drops well below zero, the course leaves on a 2-week tour of the U.S.A. and usually finds time for a swim in Florida waters. Such amenities are, unfortunately, short-lived, as the students must digest and write reports on the equipment and techniques they have observed.

After returning to Summerside for a further period of classes, projects, and reports, the course takes off for the U.K. in March to study the equipment and techniques of the Royal Air Force. As many of the students and instructors have relatives in the U.K., the aircraft resemble flying meat wagons on the outward trip. A very quick tour is made, the hard work being compensated for by a week-end off in London. Some final examinations are written after the course returns from the U.K. and before it leaves for the Arctic.

In April the course flies to a northern base such as Whitehorse where it is based for two weeks. Some students are disillusioned to find Whitehorse warmer and with less snow than Summerside. Those experienced with the Arctic retort that Whitehorse is in the Banana Belt anyway and cannot be considered "arctic".

The type of work done out of Whitehorse depends on the composition of the course. Some courses will have a majority of students who have spent years flying in the Arctic and are well versed with its problems, while others will have a majority of students who have not been in the Arctic previously.

From the northern base, flights are carried out over the Beaufort Sea as far north as the Pole and over the Archipelago with stops at Cambridge Bay and Resolute. The experienced arctic navigators are assigned projects,

such as the testing and evaluation of new equipment and techniques, ice reconnaissance, and weather analysis. Those students who are unfamiliar with the Arctic take the opportunity to put into actual practice the techniques they have learned and practiced in simulated flights farther south. Between flights, the students are kept busy evaluating their flights and the data they have obtained. On completion of the 2-week period in the north, the course returns to Summerside for the final two weeks' study.

Arctic navigation is by no means formidable, although it is singled out for special attention. Problems are encountered that are not met in lower latitudes but, once they are understood and allowance is made for them, navigation in the Arctic can be safe and accurate. (For a discussion of the problems of arctic navigation see Arctic Circular, Vol. 1 (1948) pp. 62-4).

Protection of wildlife in northeast Greenland

Information on a new Game Act for northeast Greenland is given in the Times for 31 January 1951. The Act covers the area from Scoresby Sound in central east Greenland to Petermann's Glacier in northwest Greenland, about one third of the whole island, and gives complete protection to all species of goose and their eggs. Since this area contains all the breeding grounds of the Barnacle goose and the Pink-footed goose and almost all the breeding areas of the Brent goose, the Act is of great interest to other countries to which these birds migrate in winter. In addition a reserve has been made at Sandö in Young Sound, where the Sabine gull breeds.

The Act also gives protection to certain mammals. The number of musk oxen which may be shot annually is strictly controlled, trappers being allowed to kill six, of which two only may be cows; other persons are restricted to one animal each. Only rifles may be used, and living specimens or the flesh of the musk ox may not be exported. Fox and polar bear are given a closed season and walrus are completely protected north of latitude 74°24 N. The use of poison is prohibited.

The Act comes into force on 1 June 1951. Exceptions, under strict control, are allowed in the interests of scientific research.

Hudson's Bay Company Archives

It has recently been announced by Dr. W. Kaye Lamb and Sir Patrick Ashley Cooper that the archives of the Hudson's Bay Company are to be microfilmed by the Public Archives of Canada and the Company. The records include such items as the minute books, which have been preserved in a virtually unbroken series from 1671; the reports and correspondence of Sir George Simpson, chief representative of the Company in Canada from 1821 to 1860; and all surviving fort journals and district letter books. They cover a period of more than 200 years and represent much of the early history of western and northwestern Canada. The part to be photographed immediately consists of the papers dating to 1870.

Arctic Mail

All mail for the Arctic is distributed from four main points: Edmonton, Churchill, Moosonee, and Ottawa. This does not include posts in the Labrador. Mail should be addressed in the usual fashion and marked via the correct distribution point. All mail should be sent through the Post Office as the Express Companies have no delivery facilities in the Arctic.

1. Mail for posts in the Western Arctic as far east as, and including, Spence Bay should be marked via Edmonton, Alta. Most of the post offices in the Western Arctic are served by air stage and must be prepaid accordingly. For the post offices served by the Mackenzie River, Great Bear Lake, and Lake Athabaska District Air Stage Service the postage rates are as follows:

   Letters and Third Class Matter (Printed cards, circulars, etc.) - 4¢ for the first ounce and 2¢ for each additional ounce or fraction of an ounce.

   Newspapers and Periodicals - 1¢ for 4 ounces or fraction of 4 ounces to each separate address.

   Parcels -

30¢ per lb. or fraction of a lb.	70¢ per lb. or fraction of a lb.
Camsell Portage	Fort Providence
Embarras Portage	Fort Resolution
Fond du Lac	Hay River
Fort Chipewyan	Port Radium
Fort Fitzgerald	Rae
Fort Smith	Rocher River
Stony Rapids	Yellowknife

Parcels (cont'd)

$1.20 per lb. or fraction of a lb.	$1.40 per lb. or fraction of a lb.
Cambridge Bay	Aklavik
Coppermine	Arctic Red River
Fort Good Hope	Fort McPherson
Fort Norman	Reindeer Depot
Fort Simpson	Tuktoyaktuk
Norman Wells	
Spence Bay	
Wrigley	

2. Mail for posts on the west coast of Hudson Bay and as far north as Pelly Bay, also for Coral Harbour and Igloolik, should be marked via Churchill, Man. The postage rates are as follows:

Letters - 4¢ for the first ounce and 2¢ for each additional ounce or fraction of an ounce.

Newspapers and Periodicals - 1¢ for 4 ounces or fraction of 4 ounces to each separate address.

Third Class Matter - 2¢ for the first 2 ounces and 1¢ for each additional ounce or fraction of an ounce.

Parcels - domestic rate for mailing in Manitoba. Parcels for Chesterfield Inlet, Fort Liard, Baker Lake, Tavani, and Eskimo Point can be sent by air stage if desired. The rates are as follows:

(Chesterfield Inlet, Baker Lake, Eskimo Point and Tavani)

15¢ per lb. or fraction of a lb. up to and including 10 lb.
$1.80 per parcel over 10 lb. up to and including 15 lb.
$2.40 per parcel over 15 lb. up to and including 20 lb.
$3.00 per parcel over 20 lb. up to and including 25 lb.

Fort Liard - 45¢ per lb. or fraction of a lb.

All letters are sent by the most rapid method possible without extra charge.

3. Mail for posts in James Bay and on the east coast of Hudson Bay as far north as, but not including, Port Harrison should be marked via Moosonee, Ont. Mail should be prepaid at the same rates as in (2) but parcel post is charged at the domestic rate for mailing

to Ontario. There is also an air stage service four times a year. Parcels to be mailed by air stage must be prepaid at the following rates:

15¢ per lb. or fraction of a lb. up to and including 10 lb.
$1.80 per parcel over 10 lb. up to and including 15 lb.
$2.40 per parcel over 15 lb. up to and including 20 lb.
$3.00 per parcel over 20 lb. up to and including 25 lb.

4. Mail for all other posts in the Eastern Arctic should be marked c/o Eastern Arctic Patrol R.M.S., Ottawa, Ont. The principal posts and post offices served by the Eastern Arctic Patrol are as follows:

x ALERT, N.W.T.
Arctic Bay, N.W.T.
Cape Dorset, N.W.T.
Cape Hope's Advance, P.Q.
Cape Smith, N.W.T.
x CRAIG HARBOUR, N.W.T.
Diana Bay, P.Q.
x EUREKA, N.W.T.
x FORT CHIMO, P.Q.
Fort McKenzie, P.Q.
Frobisher Bay, N.W.T.
George River, P.Q.
x ISACHSEN, N.W.T.
Ivugivik, P.Q.
Koartak, P.Q.
x LAKE HARBOUR, N.W.T.
Moffet Inlet, N.W.T.
x MOULD BAY, N.W.T.
Nottingham Island, N.W.T.
Ottawa Island, N.W.T.
Padloping Island, N.W.T.
x PANGNIRTUNG, N.W.T.
Payne Bay, P.Q.
x POND INLET, N.W.T.
Port Burwell, N.W.T.
x PORT HARRISON, P.Q.
Povungnituk, P.Q.
x RESOLUTE, N.W.T.
Resolution Island, N.W.T.
River Clyde, N.W.T.
Sugluk, P.Q.
Wakeham Bay, P.Q.
Wolstenholme, P.Q.

x indicates Post Office

The rates of postage for mail addressed to the above posts and post offices are the same as in (2) except that parcel post is charged at the domestic rate to Ottawa. Parcels intended for Port Harrison can be sent by air stage if desired and should be prepaid at the air stage rate given in (3).

Membership of The Arctic Circle

Club membership is open to all those who are interested in the Arctic. Ottawa members pay an annual fee of $2.00 (married couples $3.00) and out-of-town members $1.00 (institutions pay $2.00). All members receive the Arctic Circular.

The Club meets in Ottawa once a month during the winter. The meetings are informal and feature a lecture on some subject of general interest to the members.

All membership fees should be sent to:

Mr. A. Stevenson,
Secretary, Arctic Circle,
73 Fifth Avenue,
Ottawa

Back numbers of the Circular

Back numbers of the Circular (with the exception of the first numbers of Volume I, which are out of print) may be obtained from the Secretary at 25 cents a single copy, or $1.00 for the year.

Editorial Note

The Editor would welcome contributions from those who are at present in the Arctic or have information about work in the Arctic.

All material for the Circular should be sent to:

Mrs. G.W. Rowley,
Editor Arctic Circular,
411 Echo Drive,
Ottawa, Ont.

Authorized as Second Class Mail, Post Office Department, Ottawa

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Twenty-seventh Meeting of the Arctic Circle

The twenty-seventh Meeting of the Arctic Circle was held in the 1st. Corps Troops R.C.A.S.C. Mess, 278 Sparks Street, on Thursday March 8.

The President, Mr. Frank Davies, was in the Chair and introduced the speaker, Mr. P.D. Baird. Mr. Baird, the leader of the 1950 expedition to east Baffin Island, gave a talk on the work of this expedition, which he illustrated with many kodachrome and black and white slides.

Botanical Surveys in Central and Northern Manitoba.

By H.J. Scoggan

During the summers of 1948-50, a series of botanical surveys was conducted by the writer in Manitoba, under the sponsorship of the National Museum of Canada. Preliminary accounts of these may be found in the Annual Reports of the National Museum, and a more detailed treatment is planned in a proposed flora of the province. The present notes deal only with the work carried out in the central and northern areas.

The 1948 season was spent in the Norway House-Cross Lake district northeast of Lake Winnipeg, and in the Dawson Bay portion of Lake Winnipegosis. Included in the field party were Nick Neufeld of Winnipeg, Gerald Wilson of Teulon, Manitoba, and Rudy Ozere of Ottawa. Jim Robinson, a Cree Indian of Norway House, acted as guide.

Leaving Norway House, the party travelled by canoe down the Nelson River, across Pipestone Lake, to Cross Lake, which lies near the southwestern edge of the Precambrian Shield. Representative collections were made of the plants of various habitats, following which a trip was made westward

up the Minago River to Hill Lake, north of Lake Winnipeg. A remarkable feature of this trip was that no portages were necessary during the entire distance of sixty miles. Camp was made near the Palaeozoic contact at the west end of Hill Lake, enabling plant collections to be made both on the calcareous and the granitic formations.

Towards the end of July, work was started in the limestone district around Grand Rapids, a small fishing and trapping settlement on Lake Winnipeg at the mouth of the Little Saskatchewan River. A "horse-powered" tramway line three and a half miles long made it possible to launch the canoes above the rapids from which the settlement derives its name. Present day use of this portage is small, although its importance as a connecting link between the eastern and western sections of one of the former great trade routes of Canada was sufficient to warrant the driving of the last spike, in 1877, by Lord Dufferin, Governor-General at that time. The opinion is ventured that this famous spike, together with many others, has long since come to rest at the bottom of Lake Winnipeg after a period of greater present day usefulness as a fishnet sinker. For the final half-mile length at the west end of the portage, it is customary to unhitch the insect-ridden horse, and allow the tram to complete the trip by gravity. This it does at a hair-raising speed around several sharp bends, and the riders holding down the load have toes curled and leg muscles tensed for the quick leap to safety that is not uncommonly required when wheels and rail fail to coincide. Our canoes made slow progress against the swift current of the Little Saskatchewan (this name being applied to that part of the Saskatchewan between Cedar Lake and Lake Winnipeg), but camp was finally made on Cedar Lake at "East Mossy Portage", on the narrow neck of land separating this lake from the north end of Lake Winnipegosis. Cedar Lake takes its name from a remarkable outlying station of white cedar, at a distance of almost 200 miles from the western limit of its main area in south-eastern Manitoba. It has been described as a canoe builder's paradise, for here were at hand an abundance of cedar for the framework, large sheets of birch bark for the cover, the cord-like roots of pine and spruce for sewing the sheets of bark together and binding them to the framework, and spruce gum for pitching the seams to make them water tight. On this lake the Indians regularly assembled at the latter end of March of each year to make canoes for the voyage to York Factory with their furs.

While making the portage to Lake Winnipegosis, remains of the old corduroy road built along the swampy, northern end of the trail were seen, but the greater part

of the route offered good footing on an elevated gravel ridge. Exploration of Dawson Bay revealed the presence of many lime-loving plants, but perhaps the most interesting feature is the numerous salt springs around which grow plants more normally found along coastal salt marshes. On the return to the Grand Rapids portage, the lightened canoes were run down the awe-inspiring rapids, covering in one part a distance of two miles in six minutes. The party returned to Winnipeg on the S.S. Keenora, a steamboat originally plying Lake of the Woods, but rebuilt on Lake Winnipeg, and now rounding out its ancient life in serving isolated communities along the stormy waters of this shallow remnant of glacial Lake Agassiz.

Besides the writer, the 1949 field party again included Nick Neufeld and Jim Robinson, together with John D. Campbell of Hamilton, Ontario. The route led down the Nelson River from Norway House, across "Painted Stone Portage" on the height of land at the headwaters of the Echimamish, and into the Hayes River system. The greater part of the Hayes lies in the Precambrian, and includes a chain of lakes bearing the names Robinson, Logan, Max, Windy, Oxford, Knee, and Swampy. Many portages are necessary in the intervening reaches. About 40 miles below Swampy Lake, or about 100 miles above York Factory, the river enters the Palaeozoic formations of the Hudson Bay Lowlands, and winds with great regularity between clay banks 30 to 100 feet high, the only obstructions to canoe travel being the shallowness of the water and the occurrence of gravel bars at each bend. The flora of this section includes many lime-loving species absent from the Precambrian formations to the west. This is particularly so along the gravel beaches and bars, where, in the absence of competing forest species, masses of tansy, arnica, hedysarum, arctic vetch, painted-cup, river-beauty, and other northern species produce a breath-taking blaze of colour. The arctic influence is evident around York Factory, where such northern circumpolar species as a grass (Dupontia Fisheri forma psilosantha), a willow (Salix reticulata), and arctic daisy (Chrysanthemum arcticum) are found.

Following a week of collecting around York Factory, the party rounded the shallow and treachercus tidal waters off Marsh Point and entered the estuary of the Nelson. The swift water and many rapids of the eighty-mile stretch to Limestone Rapids, at which point contact was made with the Hudson Bay Railway, made it necessary to line the heavily loaded canoes for considerable distances, particularly around the numerous limestone headlands. The remaining part of the season was spent in the area of Wekusko and Tramping Lakes,

where it was again possible to collect both in the Precambrian and the Palaeozoic formations.

Except for the cabins of an old prospector on Knee Lake, and a Hudson's Bay Company post on Oxford Lake, no signs of human habitation were observed in the entire three hundred-mile stretch of the Nelson-Echimamish-Hayes system between Norway House and York Factory. It is impossible, however, to travel the water routes of central and northern Manitoba without being reminded of their great importance in the early days of the fur trade in Canada, and in the development of the Canadian West.

From inspection of a map, it might be concluded that the Nelson would be the most frequented course from York Factory inland. It is true that many Indians made use of its swift current in descending to the Bay, but tracking and portaging on the return trip were both difficult and dangerous, because of the frequent obstruction of the banks by great masses of ice, nor did the Nelson afford the same abundance of venison as did the various Hayes routes. Of these, one led up a main tributary, the Fox, to Cross Lake, thence up the East Channel of the Nelson to Lake Winnipeg, from where the various bands could penetrate via Cedar Lake and Lake Winnipegosis, to wintering grounds as far south as Red Deer and Swan rivers and Lake Dauphin. Joseph Smith, in 1756 and 1757, was the first European to follow this route, initiating the Hudson's Bay Company's policy of sending employees inland to encourage good relations with the Indians. It was not, however, until 1774 that Cumberland House (the oldest permanent settlement in Saskatchewan) was established by Samuel Hearne, marking the beginning of the building of Company posts in the interior in answer to the opposition of rival fur traders. From Cross Lake, another route led up Minago River to Moose Lake and the Saskatchewan River. Henry Kelsey used this route from York Factory in 1690, reaching the Saskatchewan the following year, becoming the first European to see the buffalo of the western plains. A more northern route used by the Indians led from Fox River to Split Lake and Grass River, thence via Paint, Setting, Wekusko, Reed, and Cranberry lakes to the Saskatchewan. This course was followed by Smith in 1763. The Hayes-Echimamish route via Oxford and Robinson lakes was originally little used. However, following the establishment, in 1684, of York Factory (the oldest permanent settlement in Manitoba), it became the great trade route into the interior for canoes and York boats of the Hudson's Bay Company.

York boats, pointed at both ends like a canoe, and of shallow draught, were the answer to a demand for a type of boat light enough to be taken on rollers over the many inland portages, seaworthy enough to navigate large bodies of water such as Lake Winnipeg, and commodious enough to carry a heavy cargo of furs, together with a crew of eight or nine voyageurs. The boat was steered by a foreman standing in the stern, sweep in hand, and chanting out the rhythm for the crew, each of whom managed a single, heavy sweep, bracing his feet and rising from his seat during the course of each power stroke. There was much rivalry, good-natured and otherwise, among the members of York boats when travelling in convoy. Crews of the first boats to arrive at portages would normally work together to get the boats over, but it often happened that the crew of the last boat was left to shift for itself. The voyageurs were picked for their toughness, but the work was killing, the customary portage load was two hundred pounds, the rations consisted of flour, lard, and tea, and the men were more often soaked to the skin than dry. The useful life of a boatman was short, but carried a definite prestige during that time.

It was in York boats that Lord Selkirk's Irish colonists, in 1812, travelled from York Factory to Norway House and down Lake Winnipeg, to found Red River Settlement. Norway House receives its name from a group of Norwegians commissioned to build a "winter road" between there and York Factory. They later received help from colonists driven from the settlement by the massacre at Seven Oaks in 1816, but the road did not prove feasible, and no traces remain of Swampy Lake House, a former supply depot on Swampy Lake, or of Rock Lake House, at the first of the rapids encountered on the trip inland. York Factory itself is now merely a distribution point for a few small stations some hundred miles distant.

The first botanical collections along the Hayes-Echimamish route were made by John Richardson, a member of Franklin's overland expeditions of 1819-22 and 1825-27. Also with Franklin was George Back, who used the route during the return trip of his 1833-35 expedition in search of John Ross. In 1845, John Rae, who later discovered relics of Franklin's ill-fated third expedition, travelled down the Hayes to York Factory, and made a collection of plants between there and Churchill. The most recent collection of plants made along the route before the writer's 1949 expedition is apparently that of Robert Bell, who, in 1880, made a geological survey of the country between Lake Winnipeg and Hudson Bay. The plants were determined by John Macoun, the first botanist of the Geological Survey of Canada, and founder of the National Herbarium.

A comprehensive account of the fauna of the country between Norway House and York Factory, as well as of the Churchill district, was published by Edward Preble in 1902. Woodland caribou is reported to range throughout the region, while moose reach the Shamattawa River, which joins the Hayes about 50 miles above York Factory. Three polar bears were killed for dog food while the writer's party was at this post, and a prospector from Fox River stated that he had seen others swimming as far inland as the lower Shamattawa. Indians are reported to have seen, in 1897, a pair of muskoxen on the barrens halfway between York Factory and Churchill. Preble believes this to be probably the most southern authentic record of the animal. Beaver, becoming scarce even at the time of Preble's survey, is now rarely taken, and muskrat fur is at present the principle article of trade. Other animals trapped include otter, mink, weasel, marten, fisher, skunk, red fox, lynx, gray wolf, and wolverine. The Canada goose was once a staple article of food for posts along the Bay, and was salted down in large quantities for winter use. Apart from being reduced in numbers by this means, there are indications that rapid uplift of the land along the southwestern side of the Bay has resulted in the drying up of large portions of the salt marsh feeding grounds of ducks and geese within memory of living man.

During the 1950 season, the writer was accompanied by Mr. W.K.W. Baldwin, of the National Herbarium staff. The summer was spent largely in the prairie and forested regions of south and central Manitoba, but included flights to Baralzon and Nejanilini Lakes northwest of Churchill. Camp on the eastern shore of Baralzon Lake was made on the sixtieth parallel, near the southern limit of that part of the subarctic tundra which enters the northeastern corner of the province. Extensive areas of dry Barren Ground alternate with muskeg in wet depressions, while perhaps one per cent of the terrain is occupied by small patches of stunted black spruce and tamarack. The ground is covered by a maze of tracks formed by the Barren Ground caribou during their seasonal migrations, the ruts in places being over a foot deep. Lemming burrows were numerous, but none was found to be occupied, although T.H. Manning reports that, during 1949, the lemming cycle was at a high peak in many places in northern Canada. (Arctic Circular, Vol. III, No. II (1950) p. 20). Many drowned lemmings were seen by the writer's party during the 1949 trip up the lower Nelson. No snowy owls were seen during the twelve-day stop at Baralzon Lake in early August, but many dried pellets containing the remains of lemmings were found below their rock perches.

The forested region around Nejanilini Lake, about 130 miles northeast of Churchill, is much more extensive than around Baralzon Lake 45 miles to the northeast, and is a source of fuel and tent poles for a small band of Chipewyan Indians who make their summer camp near the local Hudson's Bay Company post.

Caribou were reported in the vicinity toward the middle of August, and Mr. Horace Flett, manager of the post, stated that their normal movement was back north later in the season, prior to making their final trek southward, giving the natives three opportunities of securing meat, of which the winter supply is taken in the fall. In an open, swampy area near the post were the antlers and bones of scores of caribou that had met this fate.

In contrast to the subarctic coast of Manitoba at and north of Churchill, where the recorded vascular flora numbers some 370 species, the flora of the Baralzon-Nejanilini district is relatively poor, only 83 species being collected. The greater richness of the coastal flora may be explained by the occurrence of large forested areas near Churchill, the presence of extensive rock outcrops (none were observed in the Baralzon-Nejanilini district), the restriction of numerous species to the coastal salt marsh habitat, and the prevalence of a more humid, foggy climate, doubtless influenced by the voluminous discharge of the Churchill River.

The cold waters of the Bay are responsible for a northward trend of isotherms parallel to its shores between York Factory and Baralzon Lake. The daily mean temperature for July of these two localities, as well as of Churchill, averages between 54 and 55 degrees Fahrenheit, the same as for Great Bear Lake, more than 400 miles farther north. Similarly, the July isotherm of Brochet, near the Saskatchewan border and midway in latitude between York Factory and Churchill, is the same as that of Moose Factory, at the southern tip of James Bay, where the influence of the cold water is still evident, and a subarctic flora exists at a latitude only 60 miles north of that of Regina. During engineering operations at Port Nelson, before the decision was made to make Churchill the terminus of the Hudson Bay railway, it was found that permanently frozen ground there extended to an average depth of about 30 feet. Richardson states that, in October, 1835, the summer heat at York Factory had thawed the ground to a depth of three feet, beneath which was a frozen layer seventeen and a half feet thick. At The Rock, about 100 miles up the Hayes, frozen clay banks were seen by the writer along a small shaded stream in mid-July, 1949, but it is known that frost penetrates further into the

face of exposed banks than into level ground. This point is at about the same latitude as Fort Severn, where permafrost was also reported by Richardson. Small areas of frozen ground probably occur under insulating layers of peat at more southern localities in Manitoba, but, congruous with the general upsweep of isotherms from east to west, W.A. Johnston states that frozen ground in British Columbia occurs only locally, and then only at high altitudes.

It might be noted here that further knowledge of the Manitoba flora is of particular value in the study of plant distribution. Many plants reach in this province the limit of their range, whether this be to the east, west, north, or south of their main area. The range of climate is very great between the forty-ninth and the sixtieth parallels, the yearly average of daily mean temperature in southern Manitoba being 35 to 37 degrees Fahrenheit, and at Churchill 18 degrees. A small corner of southeastern Manitoba lies within the Great Lakes-St. Lawrence forest region, characterized by white and red pine, white cedar, red and sugar maple, and yellow birch. The southwestern portion includes a region of true prairie, north of which is an aspen-poplar parkland area of transition to the northern conifer forest, which is itself replaced in the northwest by subarctic tundra. The Hayes route to the Bay lies entirely within the conifer forest region. The trees characteristic of this forest extend north to Swampy Lake, where balsam fir drops out. Jack pine occurs on dry, sandy sites as far as the mouth of the Shamattawa, fifty miles above York Factory, while aspen drops out a short distance beyond this. Paper birch ranges to within 30 miles of the Bay, and white and black spruce, tamarack, and balsam poplar are the only forest trees of this transition section to reach the Hayes estuary. A remarkable relict station of the boreal conifer forest occurs in the Spruce Woods Forest Reserve south of Brandon, where isolated clumps of white spruce, associated with creeping juniper, are scattered throughout an area of typical prairie vegetation.

The geology, physiography, and glacial and post-glacial history of the province have also played an importan part in determining the present vegetation pattern. Borderi the Bay is the Hudson Bay Lowland, a belt of former marine submergence 100 to 150 miles wide, of which the part south of Churchill is underlain by Ordovician and Silurian limestones. North of Churchill, the acid granites of the Precambrian Shield reach the Bay, the western boundary of the Shield in Manitoba being a line drawn up the middle of Lake Winnipeg to the vicinity of Reindeer Lake on the

Manitoba-Saskatchewan boundary. The chief physiographic feature of southern Manitoba is the Manitoba Escarpment, the steep eastern slopes of a chain of north-northwesterly trending hills, of which Pembina Mountains, southwest of Winnipeg, and the Pasquia Hills of Saskatchewan, west of The Pas, are the terminal ones. The low country between Lake Winnipeg and the escarpment is underlain by Ordovician, Silurian, and Devonian limestones, largely covered with glacial drift and the deposits of glacial Lake Agassiz. The higher country west of the escarpment, forming the second major prairie level, lies on shales of Cretaceous age. A relatively small region of prairie grassland occurs in the southern part of this level, much of it in the ancient basin of glacial Lake Souris. The prairie district is characterized by high summer temperatures, warm, dry winds, and a low rainfall of varying seasonal distribution and fluctuating widely from year to year. Glacial erosion has removed all rocks of Tertiary age except on Turtle Mountain, which straddles the forty-ninth parallel. The continuous forest cover of the upper levels of this hill may properly be considered a southern outlier of the aspen-parkland, and indicates a more humid climate than on the adjacent prairie lowlands.

Tuberculosis Survey: James and Hudson bays, 1950

In the summer of 1950 an X-ray survey of the natives living in the area to be served by the new hospital at Moose Factory was carried out by the Indian Health Services of the Department of National Health and Welfare. The area covered included the west coast of James Bay and the east coasts of James and Hudson bays as far north as Cape Smith. Dr. R.N. Simpson was in charge of the Survey and the party included Dr. D.S. Davis, dentist, and Mr. K. Wedderspoon, technician.

The party arrived at Moosonee on June 12 and, after having held clinics at Albany, Attawapiskat, Moose Factory, and Moosonee proceeded to Rupert House by R.C.M.P. Peterhead boat. Clinics were held at Rupert House and Nemiscau, which was reached by aircraft, and the party then went on to Eastmain. There, as at Rupert House, the natives seemed to have many minor complaints which were thought to be the result of poor living conditions prior to the beaver quota. On the way north the party stopped at the Cape Hope Islands and arranged for the Eskimo there to go to Old Factory. At Old Factory the living conditions of the Eskimo were found to be poor since they had had little or no trapping. A beaver quota which has now been arranged should improve their economy. At Fort George, the largest settlement in

the James Bay area, 680 X-rays were taken. At this post there are two distinct groups of Indians and a small group of migrant Eskimo. The larger group of Indians, known as Inlanders because they travel inland for great distances to their trapping grounds, are prosperous and healthy, while the smaller group, known as Coasters as they stay near the post when the trapping is poor, as well as the Eskimo, have a lower standard of health.

The party left Fort George on August 1 and, after calling at an Eskimo camp on the way, reached Great Whale River the following day. The Eskimo there were found to be lazy, shiftless, and poorly nourished as they preferred to hang around the post rather than hunt for food.

After leaving Great Whale River, the party visited the Belcher Islands where three clinics were held: at the trading post on Tukarak Island, at Eskimo Harbour, and at a camp in Omarolluk Sound to the southwest. The Belcher Eskimo are isolated nearly the entire year because of fog and storms in the summer and ice in the winter. The islands are bleak but native food is plentiful and the islanders were by far the healthiest group visited. Apart from the old and crippled there was no sickness and no complaints and the only things the natives were anxious for were tea and tobacco.

After leaving the Belcher Islands, clinics were held at Richmond Gulf, a camp near Taylor Island, Port Harrison, a camp near Povungnituk, and Povungnituk. Eskimo from a camp near the Hazard were taken to Richmond Gulf by the party as the sea was too rough to unload the equipment at the camp. Cape Smith was not visited as the post manager was away and there was no radio communication. The party therefore returned to Port Harrison and left by air for Moose Factory on September 10, having completed 3474 X-rays in the course of the Survey.

At all places visited general health was examined, arrangements were made for the sick to be evacuated to hospital, and dental work was carried out. The following table gives a summary of the results of the X-ray survey:

	Indian	Eskimo	White
Number of X-rays	2419	850	205
Active Disease	106	57	8
%	4.38	6.71	3.80
Repeat X-rays %	4.517	5.65	5.37

	No. of X-rays	% Active disease	% Repeat X-rays
Moosonee	143	4.9	9.1
Albany	240	4.2	5.4
Attawapiskat	312	2.2	6.4
Moose Factory	363	2.8	6.6
Rupert House	326	3.4	2.8
Eastmain	142	6.3	4.9
Old Factory	313	4.5	3.2
Fort George	680	4.7	3.4
Great Whale River	190	13.7	8.4
Belcher Islands	159	1.3	3.15
Richmond Gulf	107	10.1	8.2
Port Harrison and Povungnituk	499	5.4	4.4

The following list is taken from the Survey carried out from the C.D. Howe:

Fort Chimo	341	3.5
Baffin Island	598	11.4

Arctic Dog Disease

In 1947 Dr. P.J.G. Plummer showed that rabies existed in the Canadian Arctic and that there appeared to be a definite connection between rabies and arctic dog disease (Arctic Circular, Vol. I (1948) pp. 37-8 and 55-6). It is generally accepted that there are at least two distinct types of arctic dog disease, one resembling distemper and the other rabies. In outbreaks of the disease a diagnosis is possible only by examination of specimens, which should be sent to the Animal Diseases Research Institute, Hull, P.Q.

There are certain precautions which must be taken when shipping both carcasses and sick dogs. If the animal has died of rabies the saliva and urine will be dangerous. The head should therefore be chopped off and placed in a tin, a lard pail is a convenient size, and shipped in such a manner that it cannot leak. The body should be wrapped in sacking and frozen if possible. If rabies is suspected the head alone is required for diagnosis. Live animals must always be treated with the greatest caution.

Before dogs can be moved from the Northwest Territories permission must be obtained from an inspector under the Animal Contagious Diseases Act or a member of the R.C.M.P. This regulation was published in a Ministerial Order of the Department of Agriculture of 11 March 1949.

As a protective measure vaccine against rabies has been sent to R.C.M.P. posts in the Northwest Territories and the Labrador, and as many dogs as possible have been inoculated. As the vaccine affords protection for a limited time only, the inoculation must be repeated, which will be done without charge. All dogs must be inoculated before permission to leave the Northwest Territories can be granted. Distemper vaccine is not supplied free of charge.

Arrangements to ship dogs or carcasses to the Animal Diseases Research Institute should, if possible, be made through the R.C.M.P.

The Editor of the Circular is anxious to obtain accounts of all epidemics of dog disease in the Canadian North. These should give as much information as possible about the date of onset of the disease, the method of infection, symptoms, numbers of deaths, and numbers of the animals affected.

Reports of Arctic Dog Disease

The "Canadian Arctic Wild Life Enquiry, 1943-9" by Helen Chitty (J. Animal Ecology, Vol. 19, No. 2 (1950) pp. 180-93) lists outbreaks of dog disease in the Canadian Arctic during these years as well as information on population changes of lemmings, mice, arctic fox, and snowy owls. Maps are given showing the prevalence of dog disease and the results of the Wild Life Enquiry since 1933 are summarized.

Mr. J.E. Frazer has sent us two reports of outbreaks of arctic dog disease in the Labrador during the winter of 1949-50. These were written by the Reverend F.W. Peacock at Nain and the Reverend F.M. Grubb at Hebron. Both accounts refer to the disease as having been introduced by sick foxes, but are reluctant to describe it as rabies and no specimens were examined. The Reverend Grubb suggests that it might have been a form of distemper but the Reverend Peacock pointed out that the disease was very different from the distemper epidemic of 1947-8. Short extracts from these accounts are given below.

Hebron: "During the early part of November we first heard of foxes dying of disease, and now and again all through the winter till March people were reporting that some were still being found. One even ran into a house porch here in Hebron one night and was killed and eaten by the dogs. The dogs first began to die of the disease shortly after the

foxes were found; most likely they were infected from eating the diseased foxes. The sickness lasted in the dogs till May, and I should say at a rough estimate that over 50 died. Most of these had not been inoculated with Distemper Virus and so had no resistance built up. There is no doubt that the inoculation saved the rest of the dogs here in Hebron."

Nain: "From March to June, this year, some 20 to 30 dogs died in the Nain District. The disease was obviously, I think, not distemper because many of the dogs which died had been immunized against distemper with Canine Distemper Vaccine 'Ferret Origin' (Green Method) ... the disease seems at first to have originated with dogs which had fought with a fox and were possibly bitten by the fox ... there is abundant evidence of cerebral disturbance among the dogs affected, indeed the Eskimo claimed that some, but only some, of the dogs were mad."

The Reverend Peacock records that a team of eight dogs, which had been immunized against distemper, caught the disease. They were "treated with Prontylin without success. This was followed with sulphur but again the disease was not arrested. By this time 3 dogs had died and the remaining dogs were treated with Homeopathic Spigelia, which is used for worms ... no more dogs died ... My experience in this case led me to think that the disease was possibly due to parasitic invasion of the bowel, that is, worms."

"I only know of about 5 foxes dying in this district but there were undoubtedly more. I have urged the Government to give us vaccine in order that all dogs may be immunized against distemper every three years."

"It should be noted that there was a great shortage of seal meat for dog food this year and that in the spring the people used rock cod to feed the dogs and this has been the case for two years. It is possible - and perhaps someone with greater knowledge than myself could verify it - that the dogs got tapeworms from the rock cod. Dogs here have been fed on polar bear meat and fresh seals: is there a possibility of trichinosis among dogs? ... [we had] dogs which suddenly became sick with vomiting and diarrhoea; they also had pain and fever. Later there was swelling of muscles and there was interference with mastication due to swelling ... the disease was most prevalent among dogs owned by people who are engaged in trouting in the spring and who probably feed the trout guts to the dogs. We have often discovered tapeworms in trout."

The Varying Lemming captive in Ottawa. By T.H. Manning

The second number of Volume III of the Arctic Circular carried a note on four groups of Varying Lemming brought to Ottawa from the Eastern Arctic in 1949. The three groups of Dicrostonyx groenlandicus richardsoni from Churchill are now extinct except for a single individual at the National Research Council. The last of the 16 captive D.g. groenlandicus taken at Igloolik died on 29 December 1950, a year and 106 days after capture. In March the total known descendants of the Igloolik group number 127, of which 50 are still living.

Records of this group have been kept to show the rate of growth in young lemming and the ages at which they develop new coats. Some preliminary experiments have also been made on young animals to determine the external factors causing the change into the white pellage. The results so far obtained indicate that temperature reduction is the main factor and that the length of exposure to light may have little or no effect in this species.

So far in this group the maximum number to be born in any one litter is 6. This has occurred only once. The greatest number of young produced by any one pair is 43, these being the result of 12 litters born during the period between February 19 and November 29, 1950. The normal time between litters is about 23 days, but in the case of the above pair, there was one gap of 58 days.

Exercise Mukluk

"Exercise Mukluk", designed to test the latest types of winter clothing and survival equipment of the R.C.A.F., R.A.F. and U.S.A.F., took place in February. Eighteen persons, representing the three services mentioned above, took part in the Exercise. After spending two weeks in bush camps in the Fort Nelson region, the group flew to Cambridge Bay where further tests were made. The co-ordinator of the Exercise was Flight Lt. Scott Alexander of Ottawa.

Plant life in the Arctic

In "Plant life in the Arctic", published in the March number of the Canadian Geographical Journal, Mr. A.E. Porsild describes the flora of the various types of arctic landscape and the ecology of these groups. He outlines the factors affecting plant growth in the Arctic and then

considers the distribution of the various species and their significance in relation to Pleistocene geology. In providing such a concise and clear account Mr. Porsild has performed a real service not only to the non-specialist who is interested in the north, but also to the professional botanist, and has filled a gap which has long needed filling. Reprints of this paper, which is well illustrated, can be obtained from the National Museum in Ottawa, price 50 cents.

Membership of The Arctic Circle

Club membership is open to all those who are interested in the Arctic. Ottawa members pay an annual fee of $2.00 (married couples $3.00) and out-of-town members $1.00 (institutions pay $2.00). All members receive the Arctic Circular.

The Club meets in Ottawa once a month during the winter. The meetings are informal and feature a lecture on some subject of general interest to the members.

All membership fees should be sent to:

Mr. A. Stevenson,
Secretary, Arctic Circle,
73 Fifth Avenue,
Ottawa

Back numbers of the Circular

Back numbers of the Circular (with the exception of the first numbers of Volume I, which are out of print) may be obtained from the Secretary at 25 cents a single copy, or $1.00 for the year.

Editorial Note

The Editor would welcome contributions from those who are at present in the Arctic or have information about work in the Arctic.

All material for the Circular should be sent to:

Mrs. G.W. Rowley,
Editor Arctic Circular,
411 Echo Drive,
Ottawa, Ont.

Authorized as Second Class Mail, Post Office Department, Ottawa

THE ARCTIC CIRCULAR

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Twenty-eighth Meeting of the Arctic Circle

The twenty-eighth Meeting of the Arctic Circle was held in the 1st. Corps Troops R.C.A.S.C. Mess, 278 Sparks Street, on Thursday April 12.

The President, Mr. Frank Davies, was in the Chair and introduced the speaker, Dr. Malcolm Brown. Dr. Brown described the work of the Queen's Medical Expedition to Southampton Island and illustrated his lecture with a film taken by members of the expedition.

Following the lecture there was a short break before the Danish film, "Next door to the North Pole", was shown to the meeting. This colour film was taken on the first Peary Land Expedition, and was produced by Hager Hasselbalch. The National Film Board has arranged to make a print available to the public through the Canadian Film Institute, 172 Wellington Street, Ottawa.

Twenty-ninth Meeting of the Arctic Circle

The twenty-ninth Meeting of the Arctic Circle was held in the 1st. Corps Troops R.C.A.S.C. Mess, 278 Sparks Street, on Thursday May 10.

The President, Mr. Frank Davies, was in the Chair and introduced the speaker, Flying Officer P. St. Louis, R.C.A.F. Flying Officer St. Louis spoke on his "Antarctic Flying Experiences" as pilot of the British Falklands Islands Dependencies Survey's Norseman aircraft in Graham land.

Caribou in Greenland. By A.E. Porsild

Until the advent of the rifle, a reasonable equilibrium probably existed, in most parts of the North American Arctic and Subarctic, between the natural increase of large game animals and the annual loss by various forms of predation.

e primitive weapons of stone age man were adequate for his eds and, when game was available, he was able to secure fficient food and clothing. Because hunting was laborious d the making of arrowheads and spear points difficult and me-consuming, more game was rarely killed than was needed r the hunter and his family. Although in the Arctic the lance between natural increases and predation was often a licate one, the vicissitudes to which hunting tribes have ways been prone were, perhaps, more frequently caused by anges in the migration routes of game animals than by ex- ssive predation. The introduction of firearms progressively anged this picture and, as regards some large land animals, ere has been a rapid, and in some parts catastrophic, crease in numbers. Again, depending on differences in the ysiography of the area, the impact of changed hunting methods s affected different game animals in different ways. In the ten precarious existence of Eskimo and Indians, caribou have ways been important. To some tribes caribou has actually en the "staff of life" and its disappearance has often meant arvation and death.

Estimates of animal populations are frequently subject errors of judgment and some early estimates of the numbers barren ground caribou should be accepted with reservation. do know, however, from the accounts of early travellers hat caribou were once plentiful from Bering Strait to the oast of Labrador. We know, also, that at present caribou re scarce or have altogether disappeared in many areas where hey were plentiful only a few decades ago. Although concern ver this has long been felt in responsible quarters, no *anacea has ever been proposed.* In Alaska, and later in Canada, attempts have been made to introduce domesticated reindeer to ease the drain on the wild caribou population or to provide a substitute in places where caribou had already disappeared. Thus far these experiments have met with only partial or indifferent success, because reindeer nomadism is incompatible with present trends of cultural development and because the North American Arctic is too thinly populated to provide a ready market for reindeer products. One of the most constructive steps taken in Canada toward the preservation of the remaining caribou herds has been the "caribou survey" which for some years has been conducted by mammalogists of the Canadian Wildlife Service (Banfield, 1950). Thus far this survey has been concerned largely with the continental parts of Keewatin and Mackenzie where very large herds still exist. It is hoped that, in addition to fairly reliable estimates of the present caribou population, the survey will determine the relation between natural annual increases and predation, for only when this has been done

ill it be possible to determine what number of animals may e killed annually by hunters, without endangering the main tock.

Barren ground caribou were once plentiful in Ungava nd Labrador but during the last fifty years they have almost ompletely vanished and only in recent years have there been eports of slight increases in the Fort Chimo area (Wright, 944; Manning, 1948); in Baffin Island caribou have been ecreasing during the last few decades at such an alarming ate that total protection has lately been considered ecessary. Labrador-Ungava and Baffin Island physiographically re very different from the vast continental area west of udson Bay but in many respects are comparable with the ice-ree parts of Greenland.

Several causes have been advanced to explain the rapid isappearance of the barren land caribou in Labrador-Ungava ut thus far no very satisfactory explanation has been given. n Baffin Island, however, it is thought that excessive unting is the primary cause of depletion (Wright, 1944). ractically no statistical information is available for either rea and it is not possible, therefore, even to estimate past present populations of the numbers killed by hunting. In reenland, on the other hand, caribou have been rather closely bserved for more than two hundred years by Danish scientists nd administrators, and it may be of interest to note briefly hat has happened there. In comparing the two areas it should noted that in Greenland the caribou is more vulnerable to unting because the ice-free parts of Greenland are deeply ndented by fjords which in many parts extend to the very ge of the great inland ice which covers all the interior that island. These fjords not only make the areas in-bited by caribou accessible to Eskimo hunters summer and nter, but they also impede north and south migration of the ribou. Furthermore, there are places along the Greenland asts where huge glaciers, in some cases more than 50 miles width, form impassable barriers to coast-wise migration.

The Greenland caribou, on the other hand, does not ffer from the predation of warble or nostril flies because ose pests apparently never reached Greenland. On the west ast, too, there are no wolves. Another factor which un-ubtedly has been of inestimable conservational value is at even to this day all hunting in Greenland is done with ngle-shot rifles. No loaded shells are sold to Greenlanders o can buy only black powder for reloading. While the use single-shot, black powder rifles and shotguns may at first pearance seem anachronistic, the practice nevertheless is

The primitive weapons of stone age man were adequate for his needs and, when game was available, he was able to secure sufficient food and clothing. Because hunting was laborious and the making of arrowheads and spear points difficult and time-consuming, more game was rarely killed than was needed for the hunter and his family. Although in the Arctic the balance between natural increases and predation was often a delicate one, the vicissitudes to which hunting tribes have always been prone were, perhaps, more frequently caused by changes in the migration routes of game animals than by excessive predation. The introduction of firearms progressively changed this picture and, as regards some large land animals, there has been a rapid, and in some parts catastrophic, decrease in numbers. Again, depending on differences in the physiography of the area, the impact of changed hunting methods has affected different game animals in different ways. In the often precarious existence of Eskimo and Indians, caribou have always been important. To some tribes caribou has actually been the "staff of life" and its disappearance has often meant starvation and death.

Estimates of animal populations are frequently subject to errors of judgment and some early estimates of the numbers of barren ground caribou should be accepted with reservation. We do know, however, from the accounts of early travellers that caribou were once plentiful from Bering Strait to the coast of Labrador. We know, also, that at present caribou are scarce or have altogether disappeared in many areas where they were plentiful only a few decades ago. Although concern over this has long been felt in responsible quarters, no panacea has ever been proposed. In Alaska, and later in Canada, attempts have been made to introduce domesticated reindeer to ease the drain on the wild caribou population or to provide a substitute in places where caribou had already disappeared. Thus far these experiments have met with only partial or indifferent success, because reindeer nomadism is incompatible with present trends of cultural development and because the North American Arctic is too thinly populated to provide a ready market for reindeer products. One of the most constructive steps taken in Canada toward the preservation of the remaining caribou herds has been the "caribou survey" which for some years has been conducted by mammalogists of the Canadian Wildlife Service (Banfield, 1950). Thus far this survey has been concerned largely with the continental parts of Keewatin and Mackenzie where very large herds still exist. It is hoped that, in addition to fairly reliable estimates of the present caribou population, the survey will determine the relation between natural annual increases and predation, for only when this has been done

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The Greenland caribou, on the other hand, does not suffer from the predation of warble or nostril flies because those pests apparently never reached Greenland. On the west coast, too, there are no wolves. Another factor which undoubtedly has been of inestimable conservational value is that even to this day all hunting in Greenland is done with single-shot rifles. No loaded shells are sold to Greenlanders who can buy only black powder for reloading. While the use of single-shot, black powder rifles and shotguns may at first appearance seem anachronistic, the practice nevertheless is

sound because it encourages the thrifty use of ammunition and, because of the extremely short range of the rifles, it impels the hunter to shoot at such close range that game is rarely lost.

Greenland extends from latitude 59°46N. to 83°39N., and covers an area of some 850,000 square miles of which 741,000 are covered by a continuous central ice cap which leaves less than 1/7 of the island, or 119,000 square miles, free of ice. This ice-free part, which in area is slightly smaller than Baffin Island, forms a rim along the coast and varies in width from a few miles to over 200. Where the foreland is widest, deep fjords penetrate to the very edge of the ice cap, while in other places the ice cap reaches the sea over a wide front. Greenland is mountainous and only the fjord area of the central part of the west coast is fairly low. The climate of the west coast is considerably influenced by the Gulf Stream while that of the east coast is unfavourably affected by the cold East Greenland Current.

Although some parts of Greenland are less suitable for caribou than are others, caribou at one time or another have inhabited all ice-free parts of the Greenland shores. From medieval Islandic manuscripts we know that a thousand years ago caribou were numerous on the southern part of the west coast and provided the early Norse settlers with an important supply of meat and skins. It is known also that the caribou became extinct in the southern part where the densest Norse settlements were, only to return in large numbers after the Norse had vanished. During the last two hundred years caribou have again disappeared from that part of the coast. The largest numbers of caribou have, however, always been found in the central part of the west coast, between Disko Bay and latitude 62°N., where the ice-free foreland is wide and where the climate and vegetation are most suitable for caribou. But even in the northern part of the west coast caribou were once quite plentiful; Rink (1857) thus estimated that a hundred years ago between 8,000 and 9,000 were killed there annually. At present there are not many caribou left in north Greenland; they have entirely disappeared from Disko although that island is separated from the mainland by a narrow strait which freezes over in most winters, and they are almost entirely gone from the Thule district where they were once quite plentiful but where the herds did not stand up to the intensive hunting which followed the introduction of firearms about the beginning of this century.

About 125 years ago when guns were coming into general use on the west coast there was a rapid increase in the number of caribou killed annually; thus Rink estimated that in the

1820's approximately 37,000 were taken annually. About 1840 the number had fallen to 25,000 and from then on there has been a rapid decrease so that at the turn of the century the average annual kill had dropped to about 1,500. Between 1907 and 1915, shortly after the caribou had disappeared on the east coast, there appears to have been a temporary but quite marked increase in the numbers of caribou on the west coast, resulting in annual kills averaging 3,000. But this did not last long, and in 1926 when the first attempts were made to regulate hunting, the annual kill had dropped to an all time low of 500. Since 1926, with closed seasons from October 1 to July 1, the annual kill has held steady at about 1,000 animals.

Greenland authorities have been slow to enforce total protection of caribou; first, because the Greenlanders needed the meat, skins, and sinews and second, because the extended journeys which the Greenlanders formerly made each summer in search of caribou provided a healthy outdoor activity in which not only the men, but the entire household took part. Speaking about the long summer journeys which were regularly performed by the Greenlanders, Rink, in 1857 wrote, "But the chief purpose of these extended summer journeys is the caribou hunt which is the favourite occupation of the Greenlanders and serves to improve their health, and to which they look forward with great expectation and joy after long months spent in their miserable huts during the dark and cold winter, when they often suffer from want and cold."

On the west coast the Eskimo population, since 1805 when the first accurate census was taken, has increased from 6,000 to 22,000. This rapid increase, together with the rifle, undoubtedly is responsible for the great reduction in the numbers of caribou.

During the last few decades there have been fundamental changes in the economy of the Greenlanders. Seal hunting, which formerly was the principal industry, is giving way to codfishing and sheep farming; the law of diminishing returns, together with the shorter open season, has made caribou hunting unprofitable and there is every reason to expect that the caribou will again become numerous on the west coast.

Whereas excessive hunting caused the great reduction in number of caribou on the west coast, hunting was not responsible for the total disappearance of caribou from the largely uninhabited and much less accessible east coast. Here the great masses of Polar ice carried south by the East Greenland Current have always been a formidable barrier

to navigation, and have caused this coast long to remain unexplored and even today largely uninhabited. Archaeological evidence has shown that small, wandering bands of Eskimo formerly migrated along this coast but in historic time only the southeastern part between Angmagssalik and Cape Farewell has been permanently occupied by Eskimo. In historic time no caribou have been known in the southern part of the coast, but in the central part the Danish expedition under Ryder, in 1891-92, encountered numerous caribou in the Scoresby Sound area; in 1899 Nathorst saw comparatively few in the Franz Joseph Fjord area and the Amdrup Expedition, a few years later, saw none. Subsequent expeditions have found evidence of past abundance of caribou along the entire east coast, but no live animals. Strangely enough the disappearance of the caribou from the central part of the east coast coincided with the first appearance there of two other mammals - the muskox and the arctic wolf. Some observers have thought, therefore, that the East Greenland caribou were killed off by wolves, but it is difficult to see how this could actually have been the case for in islands of the Canadian Arctic caribou survive despite wolf predation. Likewise, the suggestion that caribou and muskox cannot occupy the same range, is contrary to experiences in the Canadian Arctic. Other observers have pointed out that the rapid, but temporary, increase of caribou on the west coast of Greenland shortly after the change of the century, coincided with the disappearance of caribou on the east coast and that the East Greenland caribou might have crossed the ice cap. Intriguing as this theory may seem, it is scarcely possible that large number of caribou could have crossed the 500 miles of ice cap without food.

In view of the astonishing resistance of the West Greenland caribou population to prolonged and unrestricted hunting, the almost catastrophic disappearance of caribou in the much more thinly populated Labrador-Ungava and Baffin Island could scarcely have been caused by hunting alone. The experience on the east coast of Greenland shows that factors other than human predation may adversely affect caribou population.

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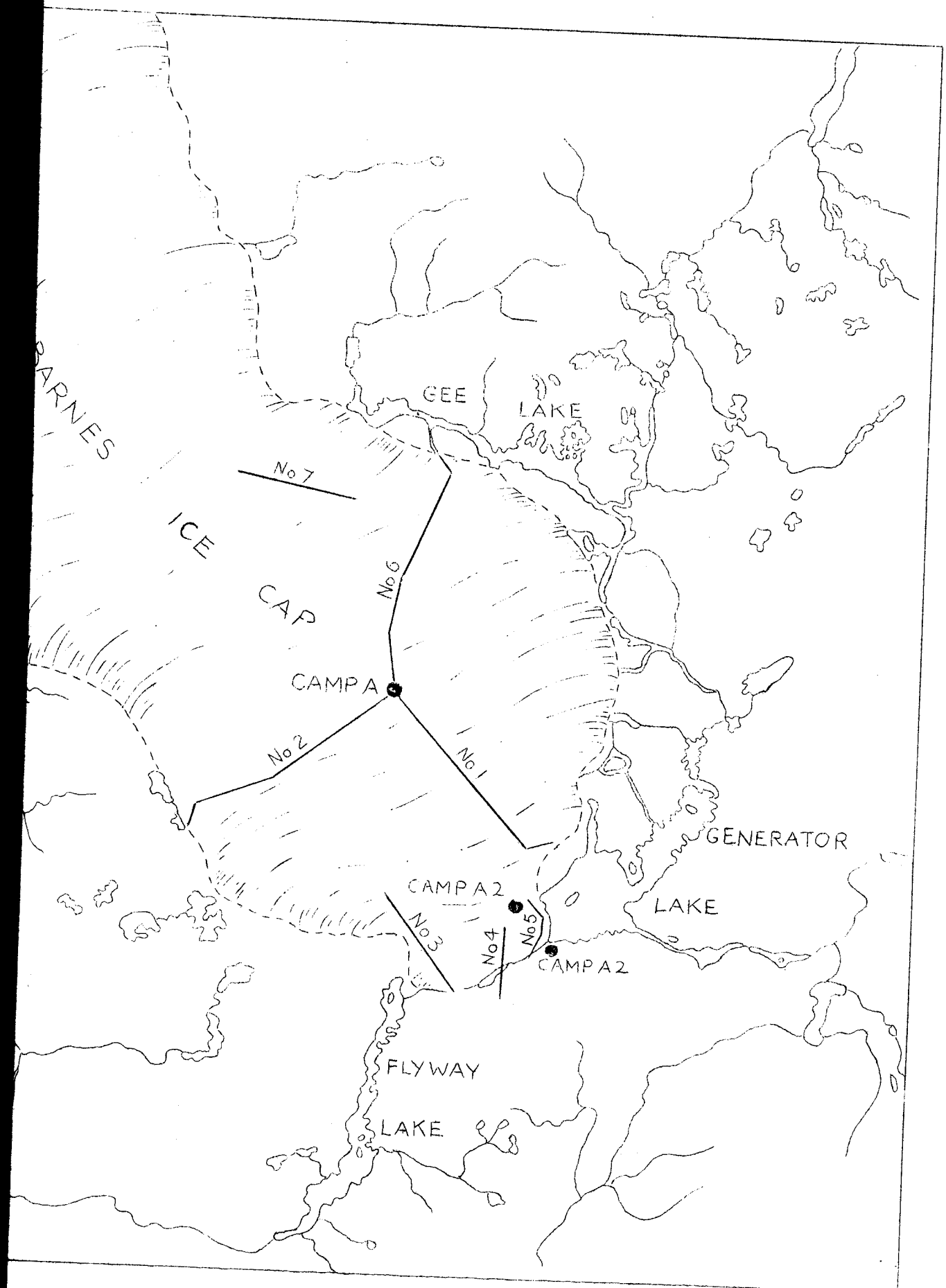
Gravity survey of the Barnes Ice Cap. By C.A. Littlewood

In May 1950 the Dominion Observatory sent me to make gravity studies on the Barnes Ice Cap, central Baffin Island, as a member of the expedition led by P.D. Baird of the Arctic Institute.[1] This ice cap is a thick mantle of ice, about 90 miles long in a northwest - southeast direction and up to 40 miles wide, covering gently rolling topography. It was hoped that a gravity survey would show details of this topography, provide an estimate of the thickness of the ice, and contribute to the regional gravity mapping of Canada being carried out by the Dominion Observatory.

Gravity was measured with a Worden gravity meter, a small portable instrument made by Houston Technical Laboratory. Desirably the ice cap should have been covered by a grid of gravity stations, but it was foreseen that this would not be practicable and the stations were planned along straight line traverses. To obtain the bottom configuration of the ice cap, the measured values of gravity at each station were compared with hypothetical figures based on a flat topography. The elevations required for the latter figures were made by rod and level.

The members of the expedition were flown in from Montreal by a R.C.A.F. aircraft and the Arctic Institute's Norseman, and by May 20 all had arrived at Clyde. A week later Camp A, the main camp on the ice cap, was established on the southeastern lobe. It did not take long to discover that the weather here, and presumably over the entire ice cap, was, as a rule, poor and unsuitable for gravity traverses which require good visibility for navigation and levelling. Records of weather at Camp A during June, July, and August show that we had four clear days in June, two in July, and none in August; snowfall amounted to 17 inches in June, 11½

1. General accounts of this expedition have been published in Arctic (Vol. 3 (1950) pp. 131-49) and the Canadian Geographical Journal (Vol. 42 (1951) pp. 212-23).


BARNES
ICE
CAP
GEE
LAKE
No 7
No 6
No 2
No 1
CAMP A
CAMP A2
No 3
No 4
No 5
CAMP A2
GENERATOR
LAKE
FLYWAY
LAKE

inches in July, and 21½ inches in August. Days with blizzard numbered five in June, four in July, and nine in August. Consequently the original ambitious plan of surveying the whole ice cap was restricted to the southeastern lobe.

The first two traverses (Nos. 1 and 2) were made from Camp A to the southeast and to the southwest. Hans Röthlisberger, of the Swiss Foundation for Alpine Research, took the levels while I read the gravity meter. His alpine experience was very helpful to me in learning to overcome difficulties in the ablation zone: the first traverse ended when I stepped up to my waist in a stream filled with slush.

Pulling a small hand-sledge loaded with the gravity meter and other gear, I left Camp A on July 19 to continue work at Camp A2, a subsidiary camp, which had been first set up on the ice edge and later moved to the south shore of Generator Lake. Midsummer was approaching and the ice cap was covered with rivers which made travel difficult. A few miles from the ice edge I cached the sledge near a shallow lake, about a third of a mile in diameter, filled with slush and water. The following day John Waller, the mechanical engineer of the expedition, and I returned for the sledge. We found that the slush lake had drained away and that the rivers which had been feeding it were pouring into great holes and crevasses.

Shortly after arriving at Camp A2 I began a gravity survey of the southernmost part of the ice cap. This was suggested by R.P. Goldthwait, the geomorphologist of the expedition, who predicted a valley beneath this part of the ice cap from a study of the local topography. He believed that the valley ran under the ice from Generator Lake to the north end of Flyway Lake. Three traverses (Nos. 3, 4, and 5) were made across this area and the results confirmed that this valley existed and showed that it followed a similar course to that predicted by Dr. Goldthwait.

Two more traverses completed the gravity survey. One extended north from Camp A (No. 6); the other lay roughly east and west (No. 7), near Gee Lake. Towards the middle of the latter traverse a broad depression of about 200 feet deep was shown to lie beneath the bottom of the ice cap. This is presumably a continuation of the valley of Gee Lake.

The three long traverses radiating from Camp A show that the ground beneath the middle of the southeastern lobe is about 100 feet lower than the ground at the ice edge. Whether this is a natural depression or whether some compensation due to isostasy has occurred is not known. The greatest computed thickness of ice is 1,550 feet, three miles north of Camp A.

In conclusion I wish to thank Franz Elmiger and Hans Röthlisberger, of the Swiss Foundation for Alpine Research, and John Waller, of McGill University, who carried out the topographic surveying, for their assistance and encouragement.

Spring supply operations for the northern weather stations

During mid-April four aircraft, two North Stars from the R.C.A.F. Air Transport Command and two C 54's from the U.S.A.F. Northeast Air Command, carried out the spring supply operations for the joint Canadian-U.S. weather stations in the far north. The weather was exceptionally favourable and the aircraft completed their trips in record time, returning to their bases less than a week after take-off.

The aircraft operated out of Resolute and distributed to the other stations supplies left the previous summer by the sea supply mission. One hundred tons or more was flown in to Mould Bay and to Isachsen, and lesser amounts to Alert and Eureka.

Antarctic party's accident

At midnight on February 23 four members of the joint British-Swedish-Norwegian Antarctic Expedition decided to make a trial run in a weasel on which they had completed repairs. The moon was full and the weather clear and fine when they left the base at Maudheim, intending to visit the site of a crashed aircraft a mile or so away and to collect some meat from the Norsel Quay. Shortly after they set off mist came up from the sea and they lost their sense of direction. They were driving at about 12 miles per hour through the mist when they saw the sea then only fifteen yards ahead. They attempted to jump out on to the ice but it was too late and the whole party went over the ice edge into the water.

Stig Hallgren, of Sweden, helped Bertil Ekström, of Sweden, to the ice edge but it crumbled and offered no hold and Ekström with John Jelbart, of Australia, and Corporal Leslie Quar, of the R.A.F., were pulled under the ice by the strong current and drowned. Hallgren managed to swim against the current and reached the nearest ice floe, some 220 yards away. With the aid of his sheath-knife he succeeded in climbing on to the floe. An attempt to swim to shore when the floe drifted landwards proved impossible and he returned to the floe, keeping his circulation going by running and jumping.

Meanwhile two other members of the expedition, disturbed by the time the party had been away, followed the weasel tracks through the thick mist, heard Hallgren shouting from the ice floe, and roused the camp. The expedition boat was buried under hard snow and had to be dug out and dragged by hand for nearly two miles to the water. With one man in the boat cutting a way through the ice and another rowing, the boat was brought to the ice floe and Hallgren was rescued. He had then been on the ice floe for thirteen hours in wet clothes, with no cap or gloves, in sub-zero weather, and apparently suffered no frost bite or other ill effects.

Microfilm records of M'Clintock expeditions

The Northern Administration and Lands Branch of the Department of Resources and Development has recently received a set of three microfilms of journals belonging to the late Admiral Sir F.L. M'Clintock. These microfilms were sent to the Branch by Mr. H.F. M'Clintock of Ardee, Co. Louth, Eire, son of Admiral M'Clintock. The films are as follows:

(1) Arctic Journal kept by Dr. Scott, R.N. while serving in H.M.S. Intrepid under Cdr. F.L. M'Clintock, R.N., 1852-4.

(2) Journal kept on sledge journey by Lieut. F.L. M'Clintock. H.M.S. Assistance, 1850-1.

(3) Arctic Journals of Admiral Sir F.L. M'Clintock in

(i) H.M.S. Enterprise 1848-9

(ii) H.M.S. Assistance 1850-1

(iii) H.M.S. Intrepid 1852-4

(iv) Yacht Fox 1857-9, with reports by Lieut. Hobson of journey in 1859 and findings of the Franklin Record, and by Capt. Allen Young of journey in 1859 to Prince of Wales Land.

Copies of the films are available at a small cost from the Director of the National Library, Kildare Street, Dublin.

Exercise Firestep

Exercise Firestep, which took place in April, was designed to test the mobility of airborne troops to move to the defence of Alaska. For purposes of the manoeuvre it was assumed that a mythical "enemy" had already secured a foothold in Alaska. The "enemy" consisted of the 4th Infantry Regiment, U.S. Army Alaska, and the Alaskan Command of the U.S.A.F. Approximately 1000 men of the U.S. Army 82nd Airborne Division, equipped with field howitzers, weapon carriers, and fighting gear, formed the home forces. The exercise lasted 24 days and marked the first time that U.S. airborne troops had participated in Alaskan manoeuvres.

Hudson Bay Route Association

The eighth annual convention of the Hudson Bay Route Association was held at The Pas, Manitoba, on 13 February 1951. The Association was formed in 1923, as the On To The Bay Association, to encourage the completion of the Hudson Bay Railroad. When this purpose had been accomplished, the name of the organization was changed and it has since devoted its efforts towards pressing for the fullest possible use of the railroad and the port of Churchill for shipping to and from western Canada. The eighth convention was presided over by Mr. W.G. Streeton and was addressed by Premier Douglas Campbell of Manitoba, Mr. Barry Hulth of the Western Export and Import Company, Major J.G. McLaughlin, President of the Hudson Bay Railway and Mr. W.J. Hansen, Director of Trade Services of the province of Saskatchewan.

"Alaska's Health"

The Arctic Circle is now receiving, on an exchange basis, copies of Alaska's Health. This is a most interesting publication which is published bi-monthly by the Alaska Department of Health. The copies sent to the Circle will be held by the Editor and may be borrowed from her at any time.

Membership of The Arctic Circle

Club membership is open to all those who are interested in the Arctic. Ottawa members pay an annual fee of $2.00 (married couples $3.00) and out-of-town members $1.00 (institutions pay $2.00). All members receive the Arctic Circular.

The Club meets in Ottawa once a month during the winter. The meetings are informal and feature a lecture on some subject of general interest to the members.

All membership fees should be sent to:

Mr. A. Stevenson,
Secretary, Arctic Circle,
73 Fifth Avenue,
Ottawa

Back numbers of the Circular

Back numbers of the Circular (with the exception of the first numbers of Volume I, which are out of print) may be obtained from the Secretary at 25 cents a single copy, or $1.00 for the year.

Editorial Note

The Editor would welcome contributions from those who are at present in the Arctic or have information about work in the Arctic.

All material for the Circular should be sent to:

Mrs. G.W. Rowley,
Editor Arctic Circular,
411 Echo Drive,
Ottawa, Ont.

Authorized as Second Class Mail, Post Office Department, Ottawa

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Hydrographic survey operations of the "Algerine" in 1950.
By D.A.H. Charles

In 1950 the M.V. Algerine was chartered by the Hydrographic Survey from Bowring Bros. for hydrographic work at Port Burwell and Frobisher Bay. The master of the vessel was Captain W. Hancock and Mr. Snow was chief engineer. The officer-in-charge of the survey was D.A.H. Charles and he was assisted by R.L. Carriere, T.A. Irvine, J.D. Graham, F.G. Lynch, and J.Y. Robichaud. The vessel arrived at Pictou, N.S. on June 14 where the survey party assembled and stores were checked. The two new survey launches, Shag and Jaeger, were given short tests prior to loading, and on June 23 the Algerine made ready for sea and sailed.

The first ice was encountered on June 26, the day following passage of the Strait of Belle Isle. The first survey objective was Port Burwell, and a direct course parallel to the Labrador coast had been laid for Cape Chidley. As the ice pans became more closely packed, course was altered to the eastward to work around the heaviest ice. The Algerine quickly proved her fitness for ice navigation and six knots were made good through heavy broken pans. Despite the ice, fog, and indirect route, the latitude of Chidley was reached on the afternoon of June 27, and course altered due west to the cape, 100 miles away. This involved working through the heaviest ice yet encountered, and passage was made more difficult as we entered Gray Strait against the heavy tide set the evening of June 28. Continuous soundings were taken and fixed during passage of this strait.

At 0400 hours on June 29, the Algerine entered Forbes Sound in the approaches to Port Burwell. Initial attempts to break a passage into the harbour that morning were unsuccessful as the ice was some eight feet thick, and the ship made fast to the ice edge in Forbes Sound. A reconnaissance was made by launch across the comparatively open water of the sound to Fox Harbour, a small inlet two miles north of Port

Burwell. This was found to be partly clear of ice, and soundings showed that it afforded a reasonable anchorage for the Algerine. By noon the ship was lying at anchor in Fox Harbour, and that afternoon a base line was measured over the ice. It was believed that the nineteen-foot tide range caused too much discrepancy in the measurements. However, a subsequent subtense base measurement checked with the ice measurements within three tenths of a foot. Triangulation was begun, the lumber to build the triangulation stations being carried over the ice.

The weather for the next few days was comparatively warm and sunny, and was, in fact, the most pleasant weather during the whole season. The sun, combined with the effect of spring tides, weakened the ice in the harbour. On July 3 the ship sailed from Fox Harbour to begin breaking out the ice in Port Burwell. Captain Hancock handled the ship with great skill, and large pans of ice were broken out and pushed piecemeal into Forbes Sound, where the rapid tide stream and favourable winds carried them into Hudson Strait. That same evening, the Algerine was at anchor in Port Burwell, now completely free of ice. The following four days the weather continued favourable and 24 triangulation stations were built, the subtense base measurement was completed, and observing done. However, the weather turned, and on July 9, when ready to begin sounding, strong westerly winds brought large pans of ice back, and all boats had to be hoisted. On July 11 both launches were again out sounding, running between the ice pans and hampered, in addition, by a considerable swell. From July 17 to 20, operations were once more brought to a near standstill by fog followed by a southeast gale. During this time, the Hydrographic Survey ship Terra Nova, Mr. Goodwill in charge, sought shelter in the harbour, while on passage to Southampton Island. On July 21 both launches completed final soundings in Forbes Sound, again contending with heavy ice and choppy seas. Rock posts were established, the tide gauge dismantled, and final sun observations for azimuth completed.

Continuous ice reports relayed from the air base at Koojesse Inlet, Frobisher Bay, through the Department of Transport radio station at Resolution Island, had so far indicated that the Frobisher Bay ice was unbroken and impassable. On July 21 the ice was reported to be moving out of the bay, and no time was lost in completing all that was possible at Port Burwell. The Algerine proceeded on passage to Frobisher at 1815 on July 21. Twenty-three days had been spent in the Port Burwell area, but on only nine of these had a full day's work been possible.

Two lines of soundings were taken and plotted in Gray Strait, which was now free of ice. This work had to be done at night and the staff was put into continuous watches. The course lay to the westward of the Button Islands to Acadia Cove, Resolution Island, which we entered at 0600 on July 22. Radio problems were discussed with the Department of Transport radio operators there, before continuing into Gabriel Strait that afternoon. Some very large icebergs and numerous small bergs and growlers were sighted in the strait, and the vessel sailed through moderately heavy broken pan ice.

Frobisher Bay was entered in the early hours of July 23, and the passage of the bay became increasingly difficult because of heavy ice. Following small leads of open water the vessel was forced over to the east shore, eventually reaching a small anchorage between the northern end of Gabriel Island and a small islet lying off that island. Here she was securely hemmed in by almost unbroken ice to the north. As these waters were completely uncharted extreme caution had to be used at all times.

The Algerine remained at anchor at Gabriel Island for two days, until from a height of land behind the harbour a few leads were seen opening up along the western shore. With considerable difficulty, and after running northwards on the east side of Chase Island as far as Field Island, the vessel managed to reach the western shore in the vicinity of Mt. President's Seat. The ice and adverse winds once more made it necessary to find shelter, and the ship anchored in Robinsons Harbour, north of Wynne-Edwards Bay, at 1800 on July 29. The following day, one launch was put in the water and as many soundings were taken as the close-packed ice would allow in this small anchorage. A party climbed a 2,000-foot peak and sighted what appeared to be slightly better conditions up the bay. But the next day the wind was strong and unfavourable and it was not until 1600 on August 2 that the vessel could proceed. Meanwhile the winds had shifted the ice, and it was possible to follow some leads up the western side of the bay, breaking through heavy ice at times. At 0530 on August 3 the ship was caught in heavy ice in the entrance to Bartlett Narrows, and carried through the narrow strait, three cables wide, in a solid ice jam by the tide, running at approximately five knots. Captain Hancock managed to get the ship's head around to the westward, so that she was carried through beam-on, and by going full ahead before she had actually reached the northern end of the Narrows, she just cleared the dangerous Charybdis Reef.

The remaining 25-mile run to Koojesse Inlet was completed without difficulty through comparatively ice-free water. During the entire passage from Burwell to Koojesse Inlet continuous soundings were taken and plotted, fixing being done by tangents to points of land.

The first task on arrival at Koojesse was the siting and construction of a fifty-foot steel tower to carry the tide gauge. A reconnaissance was made on the day we arrived, and, as the following day was foggy, the first sections of the tower were assembled on deck. It was found that the six-foot-square section originally designed did not give sufficient stability to build to fifty feet in height. It was therefore necessary to heat and bend the angle iron of the first section to open out the base to twelve feet, and we were fortunate to have the assistance of the Chief Engineer of the Algerine. Speed was necessary to get the tower constructed as spring tides had passed and every day's delay lessened the chance of getting it into a suitable site. The first section of the tower, complete with crib work, was lowered over the side on Sunday, August 6, on to a float of oil drums. Both launches towed it to the chosen site and the survey staff worked until 2200 getting it firmly in place. The following day Robichaud and Graham took charge of the completion of the tower, while the remainder of the party commenced station building. The tide gauge was in operation by August 9 and looked very impressive and solid standing fifty feet above low water. The tide range was established at forty feet at normal springs.

Triangulation continued, with all staff engaged in building stations and observing, until interrupted by the first real snowfall of three inches on August 14. From then on there were visibility difficulties, as snow squalls became a daily occurrence.

Irvine, in the launch Shag, with Lynch as assistant, commenced sounding and plotting Koojesse Inlet at a scale of 1,000 feet to the inch on August 15. The main triangulation net was carried south 20 miles to the Bartlett Narrows, using the Jaeger, while ship sounding was begun south of Deception Reef on August 17. The work progressed well until August 22, when the effects of continuous southeast winds were noticeable by the amount of heavy ice returning up the bay, and it became impossible to ship sound south of Koojesse. On August 22, and during the early morning hours of August 23, ice packed into Koojesse Inlet itself, carrying away the tide gauge tower, which was completely crushed by a pan of ice some forty feet thick. Hereafter, all tide readings were obtained by levelling from bench marks.

As the season wore on the work was hampered progressively by ice, and by increasingly cold and snowy weather. The supply ships Theron and Titus, which had arrived at Koojesse Inlet on August 24, with stores for the airfield, were delayed unloading by the prevailing conditions. The Theron sailed from Koojesse

on September 1, and struck an uncharted shoal when approaching the northern entrance to Bartlett Narrows. The assistance rendered to the Theron in the necessary beaching operations by the Hydrographic staff and launches, and the emergency repairs effected by the officers and crew of the Algerine enabled her to return under her own steam.

Soundings in Koojesse Inlet were completed by September 4 and the base of operations shifted to Pink Lady Island, twenty miles down the bay. A better, more sheltered anchorage was discovered in a small cove at the southern end of Frobisher's Farthest. This little harbour was surveyed and was used in bad weather after September 16. Temperatures night and day were now in the twenties, and by this date the snow had arrived to stay, to a depth of a foot or more. Young ice was forming in the bay on still nights. Sounding with the ship continued, but it became too rough for much launch sounding. However, the launches did as much as possible, and continued with secondary triangulation and establishing rock posts. During the second half of September, only five full working days were obtained.

By the end of September, it became apparent that little more could be accomplished. The Algerine took on water and made ready for the return journey and sailed on October 3. On the passage through the islands forming the Narrows, both launches followed the channel between Pike and Resor islands, while the Algerine navigated the channel between Frobisher's Farthest and Mitchell Island, thence eastward of Mitchell and Culbertson islands. Soundings were plotted, and both these alternative passages to Bartlett Narrows appear to be deep and in many ways preferable to the Narrows. However, a full survey is necessary before they can be used with safety. A rendezvous was made with the launches at Daniel Island Harbour on October 4.

On October 5 the temperature did not rise above ten degrees above zero. Snow squalls were frequent and heavy. Check soundings were taken in Daniel Island Harbour, and a rocky ledge was found, which had not previously been shown on plans. The same day, reconnaissance soundings were taken by the launches in Newell Sound and Leach Bay. On October 6 the Algerine continued south, making reconnaissance runs into Kneeland Bay and Ney Harbour, plotting soundings by aerial photograph. The shoreline was examined and soundings were plotted on passage from Ney Harbour to Savage Harbour in the Lower Savage Islands, outside Frobisher Bay. Two reefs, not previously charted, were tentatively plotted en route.

On October 7, with a half-gale blowing and visibility restricted to a hundred yards in heavy snow squalls, the Algerine proceeded from Savage Harbour on the return passage to Pictou. It had been intended to examine Graves Strait, Resolution Island, on passage, but the conditions prevented this. Heavy weather was encountered for the next three days.

The night of October 9, while proceeding into the northeast entrance of the Strait of Belle Isle, a signal was received directing the Algerine to the assistance of the S.S. Mapledore, aground in the entrance to Alexis River, Labrador. The Algerine reached Alexis River the morning of October 10, and completed towing the Mapledore free that evening. The following day was spent in a quick reconnaissance of the Alexis and Gilbert rivers with one of the launches before continuing to Pictou on the morning of October 12. Pictou was reached without further incident on the afternoon of October 14. Unloading operations were completed October 16, and the Algerine sailed for her home port, St. John's, Newfoundland, that afternoon.

The Algerine proved eminently suitable for northern survey work under difficult ice conditions, and a great deal of credit is due to Captain William Hancock for his personal interest in the work and his able handling of the ship. The Chief Engineer, Mr. Snow, was also of great assistance in improvising repairs when no spares were available for the survey launches. In one instance he manufactured a launch propeller, no small feat, which was extremely satisfactory and enabled work to be carried on without the delay of awaiting spares. The ship's electric welding and oxy-acetylene equipment was also invaluable, not only to the survey, but in assisting the Theron.

As a result of the season's work, two charts will be published and a third will be completed next season. The charts in the process of preparation are:-

5405 Port Burwell and Approaches

5516 Koojesse Inlet and Approaches
Culbertson Island to Koojesse Inlet

5513 Frobisher Bay, Northwestern Part

STATISTICS

Number of days in field	114
Days lost, weather	33
Days on passage	27
Days worked on survey grounds	54
Total mileage of Algerine on passage	3219
Total plotted soundings, linear miles	1628
Launch soundings, linear miles	520
Ship sounding, on survey areas, linear miles	382
Ship sounding, plotted on passage	726
Triangulation stations built and observed	60
Hydrographic monuments established	16
Shoals examined and partly examined	12

Wildlife work in the Northwest Territories

There are at present eight officers of the Canadian Wildlife Service carrying out research work for the Northwest Territories. During the past year the number of officers has been increased by the appointment of mammalogists to Fort Simpson and to Franklin and Keewatin districts. These officers are as follows:

In early July E.H. McEwen, who was employed on the caribou survey in 1950, succeeded W.E. Stevens as mammalogist at Aklavik. Mr. McEwen has started a systematic investigation of marten and beaver conditions in northwestern Mackenzie District and the northern Yukon.

D.R. Flook took up the appointment of mammalogist at Fort Simpson at the end of July. His first major work will be to study wildlife conditions in the Fort Rae area where there is a large band of Indians who are dependent on wildlife.

In the spring J.P. Kelsall, biologist at Yellowknife, and his assistant, N.G. Perret, made extensive field studies of caribou in the region between Coronation Gulf and Great Slave Lake. Recently these officers completed an investigation of musk oxen and other wildlife in the district east of Great Slave Lake. In carrying out this work, they travelled by canoe along the Thelon River route to Baker Lake.

W.A. Fuller, mammalogist at Fort Smith since 1947, and his assistant, G.A. West, have made brief investigations of beaver, marten, and muskrat conditions in southeastern Mackenzie District. They are making ecological studies in Wood Buffalo National Park with regard to the problems of management and utilization of these animals.

Between April and September of 1951 J.S. Tener, mammalogist for Franklin and Keewatin districts, completed a survey of the wildlife of western Ellesmere Island, with special reference to the musk ox.

J. Dewey Soper, who has had many years of arctic experience, has been Dominion Wildlife Officer for Alberta and the Northwest Territories since 1949, with headquarters at Edmonton. In 1951 his investigations have centred on the Hay River and Mackenzie Delta districts.

Two northern murder trials

In July 1951 two trials for murder were held in the north: one off Resolution Island, aboard the C.D. Howe, the other at Eskimo Point.

On 14 December 1950 the R.C.M. police detachment at Lake Harbour, Baffin Island, received a wireless message from the Officer in Charge of Resolution Island weather station that the station cook, T. Saunders, had been shot by the wireless operator, H.B. Pollard, and had died from loss of blood.

As it was impossible for an aircraft to land at Resolution Island during the winter months and too hazardous to cross Gabriel Strait because of open water, the Officer in Charge of the weather station was instructed to preserve the body in a frozen state until the Coroner, Magistrate, and police party came north in the C.D. Howe. In the meantime Operator Pollard was to carry out his regular duties.

The C.D. Howe arrived off Resolution Island on July 5. It was imperative that the judicial proceedings should be carried out with the least possible delay because of unfavourable ice and tide conditions. Following the investigation, autopsy, and inquest, Pollard was charged with murder. The preliminary hearing was then opened by J. Cantley, J.P. After witnesses had been called and evidence rendered, Pollard was committed for trial. At 7.00 p.m. the trial began in the dining saloon of the C.D. Howe before Police Magistrate J.R.E. Bouchard and jury. The jury retired at 2.05 a.m. on July 6 and returned after half an hour with a verdict of "not guilty". The facts brought out at the judicial hearing showed that Saunders had become violent and in addition to breaking furniture and dishes had threatened the lives of other members of the station. Pollard had seized a rifle in an attempt to subdue Saunders, but Saunders rushed at him and he had had to fire in self defence. The shot penetrated Saunders' left thigh and he died within a short time.

Okalik, an Eskimo, lived in his cabin southwest of Padlei with his wife Kimottok, their two children, Tugbuak (aged 5) and Akka (aged 2), his mother-in-law Pemik, his brother-in-law Arnaklooak, and his sister-in-law Akigevik (aged 16).

Early on the morning of May 4 Kimottok, her sister Akigevik, and her son Akka went to the Hudson's Bay Company's post at Padlei to obtain food. On their return, about 10.30 a.m., they found both Pemik and Arnaklooak dead inside the cabin.

The investigation was carried out by the R.C.M. police detachment at Eskimo Point and Okalik was committed for trial for the murder of his mother-in-law Pemik. The trial was held at Eskimo Point on July 31 before a Stipendiary Magistrate and jury. A statement given to the police by Okalik admitting the crime, which he committed on the morning of May 4 using a .300 Savage rifle, was given at the judicial hearing, along with other evidence. The motive was plainly to rid himself of his mother-in-law and brother-in-law with whom he lived in constant discord and who, by his own statement, were continually ridiculing him.

The jury brought down the verdict of guilty of manslaughter. Okalik was sentenced to serve five years at hard labour and he is presently at Stony Mountain Penitentiary in Manitoba.

R.C.N. helicopters for northern work

The Royal Canadian Navy has acquired three HTL 4 Bell helicopters for northern work. These helicopters, the first to be employed by the R.C.N., will be based at the naval air station, H.M.C.S. Shearwater, at Dartmouth, N.S. until the R.C.N.'s new icebreaker is completed (see Arctic Circular, Vol. 2 (1949) pp. 10-11). The helicopters are intended for use aboard this vessel and will also be employed in the training of helicopter pilots and maintenance crews. They will be fitted with ski-type landing gear adaptable to any terrain until they are embarked in the icebreaker, when they will be equipped with floats to enable them to land on water or on land.

The Second Alaskan Science Conference

The First Alaskan Science Conference was held in Washington from 9 to 11 November 1950. The conference was so successful that it was recommended that another should be held the following year, and if possible that it should take place in Alaska. The Second Alaskan Science Conference was held in Mount McKinley National Park from 4 to 8 September 1951. Owing to the support of the Arctic Circle and of the Arctic Institute of North America it was possible for the Editor to attend this conference. Over two hundred scientists were present, the majority of whom had been carrying out field work in Alaska during the summer season. In order to allow as many speakers as possible most of the papers read were brief and were mainly accounts of recent research rather than of worked up results. A full day's field trip to see Mount McKinley provided a splendid opportunity to observe the wild-life and flora of the park. The Conference was an exceptionally good meeting place as all members were housed in one hotel, the Mount McKinley Park Hotel of the Department of the Interior, or in railway cars attached to the hotel. The Editor feels that the experience was most valuable to her and wishes to record her grateful thanks to the Arctic Circle.

Reorganization of Hudson's Bay Company posts

In 1951 the Hudson's Bay Company formed a new Central Arctic Section. This includes seven posts, of which all but Southampton Island were formerly in the Nelson River Section. Mr. P.A.C. Nicholls, Manager of the Western Arctic Section, will also manage the new section. The three sections dealing most closely with the Eskimo are the Western Arctic, the new

Central Arctic, and the Ungava sections. At the end of October 1951 the staff at the posts in these sections was as follows:

UNGAVA SECTION: Manager, J.W. Anderson

Arctic Bay, N.W.T.	-	I.A. Gardner J. Rex
Cape Dorset, N.W.T.	-	R.T. Griffiths L.B. Pilgrim T. Tegoodlegak (native)
Cape Smith, N.W.T.	-	R.E. Knight
Clyde, N.W.T.	-	P.E. Murdoch
Frobisher Bay, N.W.T.	-	W.A. Tolboom E.M. Decker
Lake Harbour, N.W.T.	-	E.W. McCollum L.F.G. Brown Eskimo George (native)
Pangnirtung, N.W.T.	-	R.W. Peyton
Pond Inlet, N.W.T.	-	A.S. Boyd
Fort Chimo, N.W.T.	-	G.F. Reese John Watt (native) E. Sharkey
Georges River, P.Q.	-	R. Milligan
Payne Bay, P.Q.	-	J.A. Ford R.A. McConnell
Port Harrison, P.Q.	-	R.H. Ploughman J.B. Haining T. Palliser (native)
Povungnetuk, P.Q.	-	R.B. Tinling Johnny Pov (native)
Sugluk, P.Q.	-	T. Crawford

CENTRAL ARCTIC SECTION: Manager, P.A.C. Nichols

Eskimo Point, N.W.T.	-	G.M. Rennie M. Campion
Chesterfield Inlet, N.W.T.	-	J.L. Ford
Baker Lake, N.W.T.	-	A. Lunan E.J. Spracklin
Repulse Bay, N.W.T.	-	A.E. Spalding A.N. Payne
Padley, N.W.T.	-	H. Voisey
Igloolik, N.W.T.	-	W.G. Calder E.H. Mitchell
Southampton Island, N.W.T.	-	A.T. Swaffield D.C. Matheson John Ell (native)

WESTERN ARCTIC SECTION: Manager, P.A.C. Nichols

Holman Island, N.W.T.	-	W.R. Hall
Reid Island, N.W.T.	-	W.F. Joss J. Hoaluk (native)
Coppermine, N.W.T.	-	M.L. Manning
Bathurst Inlet, N.W.T.	-	D. Stevenson
Cambridge Bay, N.W.T.	-	R. Cruickshank D.A. Baird J. Milookshook (native)
Spence Bay, N.W.T.	-	J.M. Stanners W.A. Burt E.W. Lyall
King William Land, N.W.T.	-	G. Porter
Perry River, N.W.T.	-	Angulalik (native)

In addition to the reorganization involved in setting up the Central Arctic Section, the Tavane post was closed early this summer and is unlikely to be re-opened, and the following posts have been assigned to different sections:

POST	FROM	TO
Weenusk, Ont.	James Bay Section	Nelson River Section
Churchill, Man.	Nelson River Section	Central Line Section
Severn, Ont.	Northern Ontario Section	Nelson River Section

Presentation of Eskimo sculpture to Princess Elizabeth

On behalf of the Eskimo people, the Honourable Robert H. Winters, Minister of Resources and Development, presented Princess Elizabeth with a sculpture of an Eskimo mother and child, at a luncheon in Halifax on November 9. The carving is in soapstone and is the work of Munamee, an Eskimo from the Cape Dorset region. This sculpture was considered to be the finest piece of work in the large collection of Eskimo handicrafts recently brought back from the Eastern Arctic by Mr. and Mrs. J. Houston.

Exhibition of Eskimo handicrafts

During the month of December the Canadian Handicrafts Guild will show their permanent collection of Eskimo handicrafts at the National Gallery. This collection has been selected from the best work brought back from the Eastern Arctic by Mr. and Mrs. J. Houston, representatives of the Guild, who were supported by a grant from the Department of Resources and Development.

Membership of the Arctic Circle

Enclosed with this number of the Circular are a folder giving information about the Arctic Circle and application forms for membership. Would members please pass these on to friends who might be interested in joining the Circle.

Please note that, for the time being, all correspondence and membership fees should be sent to the Treasurer, Mr. J. Cantley, Apartment 11, 215 Gladstone Avenue, Ottawa, as the Secretary is at present moving house.

Editorial Note

The Editor would welcome contributions from those who are at present in the Arctic or have information about work in the Arctic.

All material for the Circular should be sent to:

Mrs. G.W. Rowley,
Editor Arctic Circular,
411 Echo Drive,
Ottawa, Ont.

Authorized as Second Class Mail, Post Office Department, Ottawa

THE ARCTIC CIRCULAR

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Thirtieth Meeting of the Arctic Circle

The thirtieth meeting of the Arctic Circle was held in the 1st. Corps Troops R.C.A.S.C. Mess, 278 Sparks Street, on Wednesday November 14.

The President, Mr. Frank Davies, was in the Chair and introduced the speaker, Dr. Ross Fleming. Dr. Fleming described his experiences as a medical officer in the Mackenzie Valley. He illustrated his talk with a number of kodachrome slides.

The coming of representative government to the Northwest Territories

From 1905, when the provinces of Alberta and Saskatchewan were carved out of the Northwest Territories, until 1951, the people of the Territories had no elected representation on their territorial government. The administration of government in the Territories was in the hands of the Commissioner acting under instructions from the Governor in Council, the Minister of Resources and Development. There was a Council of six members appointed by the Governor in Council; the Commissioner in Council had legislative powers roughly the same as those of a provincial parliament but the Commissioner and the Commissioner in Council did not own or administer the natural resources in the Territories and had no power to borrow money.

On 15 June 1951 partial representation was given. The Northwest Territories Act was amended to increase the membership of the Council from six to eight, five members to be appointed by the Governor in Council and three to be elected by the residents of the three electoral districts. The Act requires that at least two sessions of the Council be held each year and that one shall take place in the Territories. The powers of the Commissioner in Council were left unchanged.

The elected members, who hold office for three years, represent the Mackenzie District, which is divided into three constituencies, roughly as follows. "Mackenzie North" lies to the north and east of a line drawn westward from the eastern border of the Mackenzie District along the 63rd parallel until it reaches the 113th meridian, thence south across the East Arm of Great Slave Lake to the south shore of the lake and westward along the south shore of the lake and the south bank of the Mackenzie River to the 120th meridian. The remainder of the Mackenzie District is divided into "Mackenzie South" and "Mackenzie West" by the 120th meridian. All Canadian citizens, whether white, Indian, or Eskimo, who are 21 years of age or over and who have been resident in the Territories for one year are entitled to vote.

The Council elections were held on 17 September 1951: M.A. Hardie, a clerk from Yellowknife, was elected in Mackenzie North; James Brodie, a merchant from Fort Smith, in Mackenzie South; and Frank Carmichael, a trapper from Aklavik, in Mackenzie West. The appointed members are F.J.G. Cunningham, Deputy Commissioner (Department of Resources and Development); L.C. Audette (Canadian Maritime Commission); D.M. Mackay (Director of Indian Affairs Branch, Department of Citizenship and Immigration); Air Commodore H.B. Godwin, now replaced by Air Commodore W.I. Clements, (Department of National Defence); and Commissioner L.H. Nicholson (R.C.M.P.). The Commissioner of the Northwest Territories is Major-General H.A. Young (Deputy Minister of Resources and Development). The first meeting of the new Council was held in Yellowknife on 10 December 1951.

The advent of partially representative government in 1951 was the logical sequence of a number of changes in the government of the Territories which have taken place as the population and economic importance of the Mackenzie District has increased. This was described in the Commissioner's opening address at the Yellowknife Session. In 1905 provision was made for the appointment of a Council of not more than four members. For sixteen years, however, no members were appointed to the Council, no Ordinances were passed, and the Commissioner of the R.N.W.M.P. acted as Commissioner of the Territories. The sparse northern population, it was considered, did not require any exercise of the powers given to the Commissioner in Council by the Northwest Territories Act of 1905; all that was needed was policing.

In 1920 the discovery of oil in commercial quantities at Norman Wells brought increasing interest in the region. In 1921 the Northwest Territories Act was amended to enlarge the Council to six members, appointments were made to the Council, the Deputy Minister of the Department of the Interior was named Commissioner of the Territories, and the Northwest Territories administration was set up in his Department. The members of the Council, including one designated as Deputy Commissioner, were senior officials of the Department of the Interior and other government Departments.

While interest in the Territories continued and prospectors were active, there was little substantial increase in population until mineral deposits with economic possibilities were discovered. Pitchblende, a source of radium and uranium, was found at Great Bear Lake in 1930, and gold at Yellowknife in 1933. Production started at these two places in 1933 and 1938 respectively. The effect of mineral development on settlement is seen in the population figures. Between 1911 and 1931 the population of the Territories increased by less than 3,000 - from 6,500 to 9,300 - but from 1931 to 1951 it increased by nearly 6,000 - from 9,300 to 15,000. Most of this increase was in the white population of the Mackenzie District.

Yellowknife became the main centre of population. A full-fledged town soon sprang up, calling for a system of local government. Because it was not clear how various areas in the Territories would eventually fit into the usual classifications of municipality, township, and the like, a flexible concept known as the Local Administrative District was evolved. The Local Administrative District Ordinance was passed in 1939, and Yellowknife was created the first such District in the same year.

The Yellowknife Local Trustee Board originally consisted of five members, two elected by the residents of the District and three, including the chairman, appointed by the Commissioner. In 1947 the elected members were placed in a majority of five to four, but with the chairman still appointed. Finally, in 1949 the membership was reduced to eight, five elected and three appointed, and the Board was instructed to elect its chairman from among its members. The Yellowknife Financial Commission, which recommended this change, said of it: "This will constitute a body the dominating portion of which is elected by the district and gives only reasonable representation to the principal investor in the community, the federal

government". At the same time, also following the recommendations of the Commission, the financial relations between the Territorial government and the Yellowknife Local Administrative District, the School District, and the Red Cross Hospital were placed on a basis generally comparable with that of similar bodies in the provinces.

The population of Hay River expanded some years later than that of Yellowknife, following the establishment of a commercial fishing industry in Great Slave Lake and the completion of the Mackenzie Highway from Grimshaw. A Local Administrative District was created at Hay River in 1949.

Parallelling these developments in local government, two important changes in federal and territorial representation took place in 1947. First, The Redistribution Act extended the boundary of the Federal constituency of Yukon to include the Mackenzie District west of the 109th meridian. The first member for Yukon-Mackenzie River is Mr. J.A. Simmons, elected in 1949. Second, a private resident of the Territories, J.G. McNiven of Yellowknife, was appointed to a seat on the Northwest Territories Council.

In 1951 it was considered that the time had come to give the population of the Territories elected representation in the Territorial government, and Parliament, as mentioned, amended the Northwest Territories Act to provide for five appointed and three elected members. In moving the second reading of this amendment, the Honourable Robert H. Winters, Minister of Resources and Development, said that a fully elected Council and its logical corollary, an administration located within the Territories, seemed to him a proper objective at which to aim, but that for several reasons it would be unwise to achieve it in one step. He pointed out that the Territories are still greatly dependent upon the financial support of the Federal Government, and he thought that the people of Canada generally would expect the people of the Territories to be capable of bearing a larger share of their cost of government before they could reasonably expect to have a fully elected Council.

As the Commissioner said in his address, the development of a partially elected Council can be considered with satisfaction in that it is an important step in the desired direction. He also pointed out that the elected members have assumed wide responsibilities, for while they have a special

obligation towards their constituents in the Mackenzie District, their duties cover a far wider area, the Northwest Territories Council being the legislative body for the whole of the Northwest Territories.

Elections in Greenland. By N.O. Christensen and Trevor Lloyd

The first Greenland Provincial Council (Grønlands Landsraad) to be elected by direct adult suffrage held its opening session on 25 September 1951 at Godthaab. The electoral reform that brought this about was due to a new Act of the Danish Parliament, which became law on 27 May 1950.

Formerly two Provincial Councils, one each for North and South Greenland,[1] were elected indirectly by an assembly made up of chairmen of local councils, Danish officials who had resided more than two years in the country, and members of the previous Provincial Council.

All men and women of Danish citizenship (including all Greenlanders) who are 23 years of age or over and who have lived in Greenland for at least six months are eligible to vote and to run for office.

In addition to the thirteen-member Provincial Council, there are now sixteen District Councils (replacing sixty-six smaller ones), the members of which are also elected by direct universal ballot.

The first elections for the new Provincial and District councils were held on 29 June 1951. Regulations governing the elections were set out in a Royal Decree and in many ways followed those used in Danish municipal and parish council elections. They were however unfamiliar to the Greenlandic election committees, so detailed instructions and a number of printed forms and public notices were prepared in advance and distributed to ensure uniformity. Preparation for the elections began in April 1951, when surface travel to north Greenland was still restricted, so the election material was dropped by aircraft. Local supervision was in charge

[1] This account deals only with the west coast of Greenland south of Melville Bay. It does not refer to East Greenland or to the Thule area in the northwest.

of committees made up of the former local councils in the sixteen main constituencies. Thanks to this careful preparation, the elections took place without serious mistakes. In two constituencies only was it necessary to repeat the elections: in the most northerly (Upernavik) because ice conditions prevented distribution of some of the lists of candidates in time, and in the southernmost (Nanortalik) because an epidemic of measles, the first in Greenland, kept nearly everyone in bed on election day.

The nomination system caused most difficulty, since it was something new in Greenland elections. In order to be nominated, a candidate needed from five to ten sponsors. In many places election meetings were held by some candidates, and in a few cases there was evidence of a real election campaign, as for example in the capital Godthaab, where the former veteran member of the Provincial Council was defeated by a more progressive candidate after an active campaign. There are as yet no real political parties in Greenland, but in several places fishermen, hunters, or groups of workers and government employees campaigned for their favourites. The rules governing nominations were designed to encourage the formation of political parties, and it is believed that later elections will find them more active.

About 8,750 persons in West Greenland were qualified to vote, and about 6,400 of them actually went to the polls. There they filled in two ballots (one for the Provincial Council and one for the District Council) each with the name of a candidate and a "substitute". On an average 73 per cent of the electorate voted, the highest turn-out being 89.5 per cent and the lowest about 55 per cent.

The elections were the first at which women had been permitted to vote. Many women used their votes and several were nominated. None was elected to the Provincial Council and only one to a District Council. A few Danes were elected to District Councils, but none to the Provincial Council although several stood for election. The new Provincial Council, which met from 25 September to 23 October 1951 under the Chairmanship of the Governor of Greenland was made up as follows:

GREENLAND PROVINCIAL COUNCIL 1951

Constituency	Name	Votes received	Votes cast	Occupation
NANORTALIK	Jacob Nielsen	130	591	outpost manager
JULIANEHAAB	Frederik Nielsen	184	423	schoolmaster
NARSSAQ	Gerhardt Egede	207	274	clergyman
FREDERIKSHAAB	Abel Kristiansen	176	534	catechist
GODTHAAB	Augo Lynge	567	718	schoolmaster
SUKKERTOPPEN	Peter Egede	210	562	outpost manager
HOLSTEINSBORG	Knud Olsen	97	386	shop assistant
KANGATSIAQ	Kikolaj Rosing	239	376	outpost manager
EGEDESMINDE	Frederik Lynge	149	413	former colony manager
DISKO BUGT (Christianshaab - Jakobshavn)	Marius Sivertsen	141	527	trade assistant
DISKO (Godhavn - Qutdligssat)	Jens Olsen	124	602	clergyman
UMANAK	Peter Fleischer	123	549	outpost manager
UPERNAVIK	Hendrik Olsen	147	410	trade assistant

It is noteworthy that all successful candidates were native born Greenlanders and employees of the Greenland Administration. Earlier Councils had included a few hunters, fishermen, or sheep farmers.

Among the first responsibilities of the new Council was the election of two Greenland representatives on the Greenland Committee of the Danish Parliament. The men selected were both schoolmasters: Augo Lynge of Godthaab and Frederik Nielsen of Julianchaab. The Greenland representative elected to the Board of Directors of the Greenland Trading Organization was Frederik Lynge from Egedesminde.

The Northern Insect Survey for 1951. By T.N. Freeman

During 1951 the Canadian Department of Agriculture sent eleven field parties, consisting of entomologists and botanists, to the following places:

Alaska: Seward, Richardson, Big Delta, Nome

Northwest Territories: Coppermine, Bathurst Inlet, Hay River, Spence Bay, Alert

Yukon: Rampart House

Newfoundland: St. Anthony

The main objectives of the investigations were to continue the studies of the distribution, relative abundance, and ecology of northern biting flies begun in 1947 (see Circular Vol. 1 (1948) pp. 5-6 and 67; and Vol. 3 (1950) pp. 55-6), and to collect material for the Canadian National Collection of Insects as well as specimens for the Division of Botany's collection of plants. Approximately 125,000 insects and 7,000 plants were obtained. These include significant distributional extensions of many species, as well as some new species and subspecies.

The Alaskan investigations were made at the request of the officers of the Arctic Health Research Center of the United States Public Health Service, and of the Office of the Surgeon General, U.S. Army. The valuable assistance given by these officers is greatly appreciated. In addition to the biting fly studies, these investigations supplemented the earlier entomological work of the Russians, particularly that of Graf Mannerheim in 1853, and of the Harriman Alaska Expedition in 1899.

The investigations conducted at Rampart House, Coppermine, and Bathurst Inlet supplemented those of the Canadian Arctic Expedition of 1913-8, and the Fifth Thule Expedition of 1922-4.

The Rampart House party was flown from Dawson on April 5 in an aircraft that carried only sufficient equipment and supplies calculated to last the party until early June, when the balance of their rations and scientific equipment was to arrive by boat from Dawson. As they approached the abandoned settlement of Rampart House, the carburetor on the aircraft froze and a forced landing was made three miles from their destination. The motor of the aircraft was started after considerable difficulty, and the pilot decided to return to Dawson immediately, leaving the party and their supplies on the spot. Three days were required to move the supplies through the deep snow in sub-zero temperature to the abandoned settlement. Laboratory and living quarters were established in the well-known house of the late Dan Cadzow, previous arrangements for this having been made with Mrs. Rachael Cadzow through the

R.C.M.P. detachment at Old Crow. This house was, for several years, reported to be the finest house north of the Arctic Circle in North America. The supply boat from Dawson did not arrive until July 1 and throughout June the men ate "mousey" rice, found in the house, wild garlic, Allium sp., and fish.

The party at Bathurst Inlet captured many species of insects indigenous to the Boreal forest. This suggests that, during a good part of the summer of 1951, the prevailing meteorological conditions were such that these insects were carried a few hundred miles north of their normal habitat. Johnny Bourassa, the well-known bush pilot, flew the party in and it was on his return flight from Bathurst Inlet that he was forced down and lost.

The Spence Bay investigations supplemented the insect collections made by Commander J.C. Ross during the Ross expedition of 1829-33 in the Boothia Peninsula region. Similarly, the party at Alert, in northern Ellesmere Island, supplemented the insects collected during the Nares expedition of 1875-6.

The entomological work at Hay River and St. Anthony provided information that will be of value in our studies of the distribution of biting flies and other insects of northern North America.

The descriptions of insects collected by the early explorers are often inadequate for specific recognition; moreover, in many instances the specimens are lost, are badly damaged, or are in museums not easily available for study. It is therefore necessary to revisit those areas to obtain and recognize the species that were described. This avoids confusion in the application of names to those species. Our investigations have shown that many arctic insects require several years to complete their development from the egg to the adult stage. Some species do not appear in the adult stage every season, and to obtain a representative collection of every species from one arctic locality, it is often necessary to continue the investigations for two or three successive years.

A total of 38 arctic and subarctic localities have now been investigated in the course of the Northern Insect Survey.

High latitude navigation flights. By Moira Dunbar

A series of flights for the purpose of testing a number of navigation instruments and techniques under arctic conditions was carried out by the Central Experimental and Proving Establishment of the R.C.A.F. between 25 October and 3 November 1951. Those taking part, other than the aircrew, were: S/L J.G. Wright, R.C.A.F., operation commander; W/C D.A. Maclulich, R.C.A.F.; S/L K.R. Greenaway, Dr. S.Z. Mack, and Miss M. Dunbar, Defence Research Board; Dr. P.M. Millman and Dr. P.H. Serson, Dominion Observatory; Mr. F.M. Allan and Lt.-Col. E.D. Baldock, Surveys and Mapping Branch, Department of Mines and Technical Surveys; Miss V. Withington, Kollsman Instrument Company, New York; Mr. Spencer Kellogg and Mr. Caesar Fragola, Sperry Gyroscope Company, New York; and Mr. D.M. Potter, Potter Aeronautical Company, Newark, N.J. These flights gave the two representatives of the Surveys and Mapping Branch their first opportunity to use their maps in the air, and the experience gained was considered very valuable. Observations of the ground were made by these two and by myself.

The aircraft was a North Star, captained by F/L R. Johnson, and was based for the period of the flights at Churchill, Manitoba. Among the instruments being tested were the Kollsman periscopic sextant, the Sperry high latitude gyro, the Rate Corrector Unit, the RΘ-DR computer for determining bearings and distances, and the second model of the R.C.A.F. twilight computer. The sextant, which is being adopted by the R.C.A.F., is modified to give a direct reading of true heading while the sun is under observation. It proved to be very satisfactory except for inadequate lighting of the bubble during twilight conditions. The Sperry gyro showed great accuracy, having a consistently low random wander rate throughout the flights. A new plotting chart, which is the first to show the whole of Canada on one projection, proved highly satisfactory. This chart, which was produced to R.C.A.F. specifications by the Department of Mines and Technical Surveys, is drawn on a Lambert conformal projection scale 1:3,000,000, and is published in three sheets.

Three flights were made out of Churchill. The first, on October 26, was from Churchill to Yellowknife and back towards Baker Lake, turning at the Thelon River and again at Padlei and so back to Churchill. Hudson Bay was wide open, and continued so throughout the operation. Only a small amount of pack ice was seen and the shore ice was barely starting to

form. The terrain was completely snow-covered and almost all the lakes were frozen, though still fairly clear of snow. Map reading was therefore easy in all areas where the maps were good, which on this flight was more than half of the way. As we approached Great Slave Lake an increasing amount of open water was observed, mostly in rivers and lakes with a strong through current, but occasionally in lakes with no apparent major outlet. Great Slave Lake was completely open, and no ice was seen even in the narrow channels of the East Arm, or along the shore.

The second flight, on October 29, was from Churchill to Resolute Bay via the magnetic pole, and then, after refuelling, north to Stor Island in Eureka Sound and back to Churchill. Visibility was zero until Baker Lake was reached, where clouds cleared to reveal a smooth solid sheet of ice much of which was blown bare of snow.

We crossed the coast at Sherman Inlet, and from here on ice conditions were not only the most interesting but almost the only subject of observation, as the islands were largely obscured by cloud. In Victoria Strait and M'Clintock Channel the ice was solid and heavy and covered with snow. Only a few leads, most of them refrozen, broke the uniformity. This ice looked old and was very much ridged, many of the ridges having a worn-down, eroded look.

A considerable amount of haze and cloud prevented us from seeing very much of Prince of Wales Island. Bellot Cliff at its northeast corner made quite a striking landmark. The ice in Barrow Strait presented a very different appearance from that seen farther south, consisting of a jumble of ice pans of different sizes, shapes, and general appearance, which were cemented into a more or less solid sheet by young ice. Leads were common, some of them open, some frozen over or in process of freezing.

After leaving Resolute it rapidly became dark and little further observation was possible. On the way back to Churchill an unexpected change of wind blew the aircraft off course. However, it did not take the dozen or so navigators on board very long to figure out that it was the aircraft and not the stars that was in the wrong place, and suitable corrective action was taken. A display of aurora was visible in the west as we flew down the west coast of Hudson Bay.

The third flight, on November 1, followed the same route to Resolute Bay except that the turning point was farther north, off the mouth of Ommanney Bay. From Resolute we flew straight back to Churchill. Cloud distribution and flight track were however sufficiently different to avoid a monotonous repetition of the observations of the previous flight. King William Island was again mostly obscured but we had a good view of the north coast, just west of Cape Felix. At this time the coastline, which is flat and featureless, was quite easily visible, and so was the tide crack between the smooth fast ice and the pack. It was not hard to believe, however, that later in the year, when there is more snow, the coast itself might be very hard to distinguish and the ice-edge be taken for the coastline. This is of course a well-known difficulty with low-lying arctic coastlines in winter and is responsible for many of the inaccurate outlines which are only now being removed from the maps.

The southwest coast of Prince of Wales Island is also low-lying and featureless in outline. On the U.S.A.F. Aeronautical Chart (1946) it is impossible to identify any features except Cape Swinburne. The new National Topographic 8-mile sheet of the southern part of the island is a very great improvement. On this map the whole tip of the island is placed about 35 minutes farther east. This position is undoubtedly more accurate but it would seem that it still may not be correct, as it does not tie in with our time of crossing the coastline on either flight.

The ice in Ommanney Bay was solid and quite rough and ridgy. The Rawlinson Mountains to the southwest of the mouth of the bay made a good landmark. Though apparently not very high they stood out well in contrast to the low land behind them and the sea ice in front. The edge of the bay ice was clearly marked, running in a line from Minto Head to the Hay Islands. The ice immediately to seaward of it was newer and smoother looking, but farther out there was an agglomeration of very rough, old-looking floes which must have been floating around for several seasons. A large lead, partly open, was seen just before the turning point.

The sun was setting as we took off from Resolute, with a fine pair of sundogs for company. As we approached Somerset Island the little round Limestone Island made a very good landmark, visible from a long way off because of its dark vertical cliffs and flat snow-covered top, like a cake with frosting on

it. It is completely round except for a spit like a tadpole's tail on the landward side. This is one of the earliest known points on the south side of Barrow Strait, being the Cape Bunny of Parry's first voyage. Seeing it only from some distance away he thought it was part of the main island, which he called North Somerset after his home county.

Bellot Strait looked incongruously like a man-made canal, cut straight and narrow between high banks. Actually of course it is about two miles wide, and the banks are hard rock rising to about 1,500 feet, but from 10,000 feet it is easy to forget this. A patch of open water was seen at the east end of the strait.

As we continued south over Boothia Peninsula the sun set once again, one might reasonably have expected for the last time that day. A few minutes later, however, without any change of altitude of the aircraft or dip in the visible horizon, it quietly rose again (in the west) and sat on the horizon for one or two minutes before disappearing for the third and last time.

An undercast set in some distance south of Spence Bay. By the time it cleared it was getting too dark for ground observations and the return to Churchill was without further interest except to the star gazers. So ended a series of flights which had been highly successful from the navigator's point of view and very interesting to the ground observers. We were very lucky in our weather, because although there was plenty of cloud we saw a good deal of the ground, far more than we had dared to hope for at that time of year.

It was quite an experience to watch a large number of navigators poring over their various instruments, charts, and tables. A certain amount of coordination was necessary between some of them, and this, in the main cabin of a very noisy aircraft, without benefit of inter-com, presented some considerable difficulty. The technique employed to get simultaneous readings of the sextant and gyro is perhaps worth recording. I have a mental picture of Miss Withington, standing on a platform with her eye glued to the sextant; Mr. Kellogg (or Fragola) staring fixedly at the gyro as though he expected it to fly away; and Mr. Fragola (or Kellogg) poised between them with one hand hovering over his colleague's shoulder and the other by Miss Withington's calf, ready to give them both a sharp slap at a signal from S/L Greenaway, who was sitting at

a chart table with a stop watch in his hand. A simple and effective method, though Miss Withington was occasionally seen to buckle at the knee on receipt of an over-enthusiastic "cue".

Correction

On p. 72 of the Circular for November 1951 it should have been made clear that the ecological studies made by W.A. Fuller and his assistant, G.A. West, of the Canadian Wildlife Service in Wood Buffalo National Park related to the management and utilization of the buffalo only.

Subscriptions for 1952

Members are reminded that their subscriptions for 1952 ($2.00 for Ottawa members, or $3.00 for combined membership for husband and wife, and $1.00 for out-of-town members, other than institutions) are due on January 1, and are payable to the Treasurer, Mr. James Cantley, 215 Gladstone Avenue, Apt. 11, Ottawa. It will be greatly appreciated if members would pay promptly.

Owing to currency regulations it is not always convenient for members of the Arctic Circle residing in Europe to pay their subscriptions to the club in Ottawa direct. Through the courtesy of the Director, the Scott Polar Research Institute will now receive the subscriptions of members from both the United Kingdom and the Continent of Europe and will transmit them to Canada from time to time. European members should forward their 1952 subscriptions (5/-) to the Director, Scott Polar Research Institute, Cambridge, England and mark them "Arctic Circle Subscription".

Changes of Address

Members are earnestly requested to advise the Treasurer, Mr. James Cantley, 215 Gladstone Avenue, Apt. 11, Ottawa, promptly of any change of address.

Note from the Committee

The Committee would like to express its thanks to Mr. H.V. Serson, Mr. E.L. Hagg, Mr. J.A. Warwick, and Mr. R. Thane who have jointly operated the projectors for films and slides and have brought the equipment to each meeting during the past year.

Editorial Note

The Editor wishes to thank Miss Margaret Murray and Miss Moira Dunbar for their assistance with the Circular, Mr. A.E. Porsild and Mr. T.H. Manning for their advice, and Mr. J. Curran for drawing the maps.

The Editor would welcome contributions from those who are at present in the Arctic or have information about work in the Arctic. All material for the Circular should be sent to:

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