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# Exercise "Musk Ox"

## Asserting Sovereignty "North of 60"

**Hugh A. Halliday**

The Second World War was over and the Canadian armed forces were being reduced rapidly. The first chilly blasts of the Cold War had not yet penetrated to the consciousness of most Canadians. What role could the forces play in the postwar world? The most obvious answer was to revert to those interwar operations that had most directly benefited the nation - aerial surveys, northern communications, limited engineering projects. New tasks had evolved; aerial search and rescue was an example.

The Canadian government was aware that it had neglected the north during the war; the American presence in the Alaska Highway, CANOL, and aerial delivery routes via the Arctic had been more prominent than that of the nominal owners of the region. This was continuing even into the postwar period; early in 1946 the USS *Midway* was cruising in the Labrador Sea and Davis Strait areas, experiencing Arctic flying conditions and noting the effects of sub-zero temperatures on carrier-borne aircraft. "Musk Ox," publicly described as a test of military equipment and capabilities in the north, was also a gesture to reassert Canadian sovereignty "north of 60."

In October 1945, in co-operation with the RCAF, Exercise "Musk Ox" was organized as a continuation of previous years' exercises. In this case it was a non-tactical operation (i.e. no simulated fighting), intended to study the problems of living and moving with over-snow vehicles in the Arctic barrens in winter. The route negotiated by participants in "Musk Ox" was from Churchill, Manitoba to Edmonton, Alberta, via Victoria Island and Fort Norman, NWT - 3,100 miles, much of which had never before been traversed by any vehicle,

The exercise was preceded by four weeks' training at Camp Shilo and six weeks' advanced training at Churchill. Unhappily, the northern base consisted of makeshift wooden buildings

with unreliable oil stoves; fires were almost a daily occurrence. Most were quickly extinguished, but a blaze on the morning of 3 February destroyed an all-ranks lounge, killing two servicemen. A rotary snowplough, blowing snow against adjacent huts, prevented more extensive damage.

The interval at Churchill was used to train personnel in Arctic survival methods including igloo building. The Army conducted short forays into the Barrens, co-operating with aircraft. A three-day test of equipment was dubbed Exercise "Kelsey," in honour of Henry Kelsey, the Hudson Bay Company's 17th-Century trailblazer into the interior. A four-day trial in early February was named Exercise "Hearne," for Samuel Hearne. These were not the only bows to history. On 27 January a party of military attachés representing seven countries arrived in Churchill to observe preparations for "Musk Ox"; on the 29th they visited Fort Prince of Wales. A seven-man guard of honour posted on the ruined walls presented arms. An RCAF officer wrote:

It is believed that this is the first time a guard has been mounted on the 213 year old fort since Governor Samuel Hearne returned in 1783 after surrendering the star-shaped fortress the year before to a force of 400 Frenchmen under Jean François Galoup, Comte de la Perouse, who landed his men in three sailing vessels.'

Preliminary tests on Churchill taught some lessons. Equipment had to be secured firmly or it would be damaged aboard pitching vehicles. Tracked over-snow trailers were both too cumbersome (they tended to dig into drifts, straining the towing vehicles) and too frail; they would have to be replaced with towed sleds. Aircrews had difficulty spotting white and aluminum-finished vehicles from the air; it was proposed to paint vehicle roofs orange.

Meanwhile, a train of two snowmobiles and two tractors pulling supply-laden sledges



CIFPU PL 37648

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**Top left:** The buildings at Churchill were very flammable. In one case two servicemen were killed when caught in a burning building.

**Top right:** Musk Ox personnel were put through rigorous training prior to the exercise, including learning how to make an igloo.

**Left:** A line of Penguins pulling sleds awaits the word to depart Churchill.



CIFPU PL 37452

(Lieutenant-Colonel Graham Rowley commanding) proceeded from Churchill to Baker Lake to prepare an airstrip and establish a station recording weather and magnetic compass information. Keeping this party supplied was the first major test of army/air co-operation this far north. It was quickly realized that air drops directly over vehicles or encampments might not be possible at the desired times, and the recovery of scattered cargoes slowed the tractors. A more efficient method was to paradrop supplies several miles ahead of the troops, preferably at a possible bivouac location. A small team landed by ski-equipped Norseman might then recover the parachutes and organize the cache into a compact site.

"Musk Ox" proper commenced on 15 February 1946 when the Moving Force - 11 Canadian-designed "Penguin" snowmobiles, and one American A. 29 "Weasel" vehicle and 48 men - set out from Churchill. Lieutenant-Colonel P.D. Baird (veteran of Exercise "Lemming,"<sup>2</sup> March-April 1945) commanded the column. His party included three American army observers and Lieutenant James Crael, RCN. The operation had been widely publicised in advance; a large contingent of senior officers and reporters was on hand for the departure. An ancient six-pounder gun signalled the start; the vehicles paraded for the brass, then headed north. Their destination was Edmonton by way of Baker Lake, Cambridge Bay, Coppermine, Port Radium, Norman Wells, Fort Simpson and Fort Nelson; three vehicles would detour briefly to Denmark Bay between March 18th and 21st.

Although the Moving Force was small, it was backed by a support force of 221 men (RCAF not included) working out of Churchill, Baker Lake, Yellowknife, Norman Wells and Fort Nelson. These included 33 men serving three LORAN sites (Long Range Navigation) at Hamlin, Dawson Creek and Gimli, transmitting radio signals for both vehicles and aircraft to check their positions.



The "Penguins" (officially known as the Canadian Armoured Snowmobile Mark I) had been developed as a two-man armoured reconnaissance vehicle; for "Musk Ox" they had been modified to carry five persons. With only a 12-inch clearance they would take a beating on hummocky shelf ice and traversing boulder-strewn terrain; their 42-inch wading capacity would later get them across shallow rivers.

The "Weasel" broke down almost immediately and was eventually returned to Churchill. "Penguin" fuel consumption on the first leg was so great that at Baker Lake the force was cut to ten vehicles, to ease the pressure on the air resupply element. While primarily an Army exercise, designed to test vehicles, equipment and techniques, RCAF aircraft and crews were analyzing their own tools and techniques. The former included devices to move cargoes inside aircraft and speed parachute drops; the latter included attempts by Dakotas to "snatch" gliders from the ground after they had delivered their loads to the Moving Force. Nevertheless, the air force was there chiefly to serve the army, delivering mail, fuel, oil, food, spare parts and special equipment.

From Churchill to Baker Lake the Moving Force had been broken up into three sections travelling about 20 miles apart; after Baker Lake the smaller force travelled in two sections. This gave some flexibility to the exercise; the breakdown of one vehicle, for example, did not bring all to a halt.

The arrival at Baker Lake provided an opportunity to settle a friendly dispute. Private A.C. Regimbai, who kept a diary of "Musk Ox" while serving with base units, reported on 4 March:

Judgement has now been given on the bet on beards between Colonel Rowley of the Army and Lieutenant Croal of the Navy. The Navy won. The bet on beauty and length of growth of beard was made by the two men in Churchill before Rowley, 33, set off with the Advance Party to Baker Lake. Judgement was given by an Eskimo woman when Lieutenant Croal, 29, arrived with the Musk Ox Force. This afternoon the two contestants hiked to the igloo of Mrs. King Id-Uack Doma. She smiled pointing to Lieutenant Croal... "Doma" and that's all she said. Prodded further she explained to Rowley who can speak Eskimo that she liked the soft quality of Croal's beard, though Rowley's was fuller.<sup>3</sup>

Climate and terrain were gruelling. In February, around Churchill, the winter was particularly severe, harsh even by Arctic standards with daily mean temperatures of  $-25^{\circ}$  F as opposed to normal mean readings of  $-17^{\circ}$  F. Denmark Bay was an area which even the Inuit avoided because of its bitter winter climate. Fortunately, "Musk Ox" was as much a test of clothing as of mechanical items; five years of experimentation and application had evolved excellent protective clothing.

The climate and weather complicated travel because blizzards reduced visibility and piled up drifts at every halt. Daytime storms were most



NAC PA 196939



NAC PA 196940

Though primarily an army exercise, the Air Force was crucial to the success of Musk Ox. A variety of aircraft were used to keep the expedition supplied including the Noordyn Norseman (above left), the Waco CG-4 Glider (below left) and the C-47 Dakota (below left, in background).

poor; following winds blew exhaust fumes into the cabs; when weather permitted, the men preferred riding on the roof. Moreover, the "Penguins" and their sleds needed constant attention and occasional replacement; a situation report for 10 March described a day only slightly worse than normal as the rocks took their toll:

Continuous sled trouble has caused early halt. One Weasel sled total loss; two failing, one Canadian sled total loss, four failing. One Weasel sled dropped from parachute racks damaged on landing and is total loss.<sup>5</sup>

March 15th was a memorable day for "Musk Ox." Arriving at Cambridge Bay, the "Penguin" crews rendezvoused with the RCMP vessel *St. Roche*. When an RCAF Norseman alighted, the array of transportation methods represented all three prime elements - land, sea and air.

An expedition of this sort might have been expected to be a hardship. Such was not the case. On the move, the soldiers were sheltered in heated vehicles; at night they were provided with special tents, heaters and clothing developed over years of experimental winter warfare. Food was no problem; fresh supplies arrived routinely by air. On the other hand, the time spent servicing the "Penguins" had unfortunate consequences; on 28 February it was reported that half the personnel were suffering from carbon monoxide poisoning while sheltering in stationary vehicles.<sup>6</sup>

Nevertheless, Captain R.R.M. Croome, the Medical Officer with the Moving Force, was severely critical of hygienic standards and discipline. Personal cleanliness had not been stressed in planning "Musk Ox" in the belief that washing and shaving removed "protective oils." Many officers and men had grown unkept hair and beards, seldom washed until arrival at Port Radium, and wore dirty clothing until it was fit only to be discarded. Captain Croome disagreed with this approach; he stated that personal hygiene was particularly important for military operations in Arctic conditions; his reasons were stated forcefully:

troublesome, so occasional all-night runs were carried out. Sergeant E. Williams, like Private Regimbai, kept a diary which described the whole expedition in detail. Excerpts from his entry for 28 February illustrate the conditions at that time.

Didn't get up till after 1000 hours. Had breakfast on "K" rations and then got out to survey the damage done by the blizzard that had howled around all night. Drifts were everywhere, sled covered, and due to the blowing snow it was impossible to take pictures.. The day was spent clearing out the motors of snow, etc and warming 'em up. We were on our way by 1900 and though visibility was bad travelled all night with a few stops.<sup>4</sup>

On the mechanical side, the snowmobiles presented unexpected problems. Venting was

**Above right:** The Musk Ox convoy rendezvous with the RCMP schooner St. Roche at Cambridge Bay.

**Below right:** A great deal of effort was needed to keep the equipment serviceable. Here repairs are made to the medical Penguin.

- (a) Dirty, sweaty or greasy bodies, hands and feet result in dirty, moist or greasy clothes, thus lessening the insulating value of the clothing.
- (b) Slovenliness lowers morale and breeds lack of discipline.
- (c) There is no more detrimental effect from washing and shaving in the Arctic than in such "northern" cities as Winnipeg and Edmonton.

Of discipline itself he was equally critical. "Musk Ox," he pointed out, was a postwar exercise involving personnel who expected to be released from the army soon after completion. The conditions were not severely trying, and few understood why they were doing it. Apart from slovenly appearances of all ranks, Croome was critical of other points - too close relationships among officers, non-commissioned officers and enlisted men plus lack of camp discipline manifested in poor waste disposal and sites left cluttered as they moved forward.<sup>7</sup>

On at least one occasion the party took a wrong turn up a river valley and had to backtrack 20 miles to correct its course. In mid-March they were navigating with maps based on the 1833 travels of Commander George Back. Nevertheless, press reports notwithstanding, they were not the first vehicles to venture this far north; in 1929 a Hudson Bay Company employee named Brown had taken a tractor train to Chantry Inlet.

A 306-mile leg from Cambridge Bay to Coppermine took the "Penguins" along shelf ice. Although maps were poor, following the Arctic shoreline was easy enough. Vehicles and sleds often ran over ice blocks; the trip was hard on suspensions, transmissions and sled runners. One vehicle suffered a complete transmission failure on 28 March and had to be towed the last 20 miles into Coppermine, where component changes restored its mobility. The same vehicle gave further trouble on 5 April (steering yoke failure) and 21 April (loss of drive to front axle); by the latter date it had travelled 3,872 miles.

April 4th was a day everyone would have preferred to forget. Approaching Port Radium, a



snowmobile and sled broke through lake ice. There were no injuries then, but a local civilian driving a caterpillar tractor also went through the ice and was drowned while assisting in recovery of the "Penguin."

Although the trek across the Barrens was arduous, the seven-day, 245-mile run from Fort Simpson to Fort Nelson in late April was described as "the most difficult stretch during the entire trip." Racing thaws and ice break-up, maintenance crews dealt with a succession of mechanical breakdowns. Replacement parts routinely arrived by air. Towed sleds, which had been demanding enough on snow and ice, became difficult to drag over mud and bare ground.



*Left: Fording a river on a makeshift raft made from locally cut logs and air-dropped barrels.*

The Mackenzie River, crossed on 20 April, had posed no problem; the ice was still thick. Subsequent rivers had been more difficult; even small streams had presented steep banks on which the "Penguins" threatened to capsize. To help the expedition, advance parties were flown in to prepare fording and rafting sites. Lieutenant Croal, the naval officer accompanying "Musk Ox," had charge of this work. Each site presented its own difficulties. A glider delivering equipment and a replacement "Weasel" crashed at the Petitot River on 12 April; the American pilot was seriously injured. Another glider brought medical help; the casualty was then evacuated through a "glider snatch." The Moving Force crossed the Petitot with difficulty on the 26th, alternately fording, wading and being towed. There was no option on the 28th at the Nelson; although some thought was given to "swimming" at least one vehicle, all were ultimately rafted across the swollen river. The rafts were built of timber cut on the site plus empty gasoline drums that were air-dropped. A civilian bulldozer on the far side winched them across the river.

The longest leg of "Musk Ox" was a 394-mile journey from Fort Nelson to Grand Prairie, completed in four days. This was done on the gravelled but unpaved Alcan Highway. For most of the trip dust so reduced visibility that the "Penguins" were spaced at half-mile intervals so that crews might see ahead. Filters borrowed from wheeled vehicles were fitted, but these had to be changed every hour; oil had to be changed every 50 miles. Engine failures became common; by the time the convoy reached Grand Prairie, one "Penguin" was on a flatbed truck, another

was under tow, and a third would not start. Six engines had been replaced over 36 hours. The force commander decided that the trip was now over; the vehicles travelled by rail to Edmonton, parading through that city on 6 May 1946. Sergeant Williams described the event from an "Other Ranks" viewpoint:

Went to the hotel across from the freight yards and quaffed a few - seven or eight - and then went to the vehicle for the parade. Started off at 1445 hours and headed through the town. Fairly good reception - no hell though. Got back to the Armouries and were addressed by the Lieutenant-Governor of Alberta, and this was answered by Colonel Baird, and then came the long-awaited (81 days) command, "Musk Ox Moving Force, Dis-Miss!"<sup>8</sup>

The "Penguins" had proved successful Arctic and Barrens travellers, notwithstanding continuous maintenance to repair or prevent damage. Although a "Weasel" had broken down soon after leaving Churchill, another was delivered on 14 April by glider to the Petitot River and completed the journey without mishap, although at one point its tracks were immobilized by mud which had to be dug from the track sprockets before proceeding.

The exercise tested three different types of towed sleds carrying rations, stoves, extra tenting, and fuel. A total of 34 were used at various times; some started from Churchill while others were air-dropped over the course of "Musk Ox." A farm bobsled used between Cambridge Bay and Fort Norman was abandoned because repairs would have wasted time; twelve small Canadian sleds (maximum capacity, 600 pounds) completed the journey, though with frequent runner changes. Of 21 larger American sleds (maximum capacity, 2,000 pounds, although normal load was 1,400 pounds), two were wrecked when parachutes failed to deploy, four were wrecked on the trail, 12 unserviceable or unnecessary, and three completed the journey, although their runners had been replaced during the exercise.

The air supply side of the exercise was as important as the vehicle component. No. 1 Air Supply Unit had been formed at Gimli, Manitoba

in November 1945 specifically for "Musk Ox." The main base was transferred to Churchill on 6 January 1946; a detachment was established at Yellowknife on 14 February, charged with laying down fuel caches ahead of the Moving Force. On 21 March the Churchill establishment was moved to Norman Wells. Throughout the exercise, No. 1 ASU was directed by Wing Commander J.G. Showier, AFC, an experienced transport pilot who would later be awarded the Trans-Canada Trophy (better known as the McKee Trophy) for contributions to Arctic navigation and mapping. His second-in-command, Squadron Leader J.S. Coombes, AFC, had been a bush pilot before the Second World War and had flown extensively in northern Alberta during the war.

No.1 ASU used six Douglas Dakotas and three Noordyn Norseman. The Dakota was the workhorse of the operation; its range and load-carrying capacity enabled it to deliver substantial cargoes over long distances. The smaller Norseman was deemed necessary for emergencies (i.e. casualty evacuation). Both types reconnoitred the trail ahead of the Moving Force. Additionally, several Waco CG-4 gliders (also called Hadrians) were deployed by American crews. The gliders represented a fading technology, but in 1946 they could still deliver a bulky cargo that would not have fit into a Dakota. Thus, so-called "workshop gliders" carried machinery necessary to effect vehicle engine changes in the field.

In its final report, No.1 ASU listed its achievements: 419 tons of cargo moved (372 tons of which were dropped or landed directly to the Moving Force), 792,000 miles flown; serviceability rates maintained at 80 percent for the Dakotas and 87 percent for the Norseman, achieved by ground crews commonly working ten or twelve hour days, seven days a week. Although roughly four percent of cargoes had been lost or damaged, the unit had succeeded to parachuting two cases of beer to the troops without breaking a bottle.

Air force documents described "Musk Ox" as a triumph; indeed the diary of No. 1 ASU smugly observed that aircraft alone could have transported the Moving Force to its destinations

**Right:** *The end of the journey - the arrival and parade through Edmonton.*

without the need for all that driving! Seen from the Army side, however, the RCAF had not always been punctual in delivery and on occasion vehicle refuelling was slowed because fuel drums had been scattered. This was particularly challenging in wooded terrain.

There were difficulties and surprises. Weather had delayed many flights; the chief problem was high winds and blowing snow which frequently reduced ground visibility to 1 / 8 of a mile. Radio communications and navigation were also complicated by northern phenomena; weather forecasts were incomplete and irregular. Nevertheless, morale was high among all RCAF ranks. Everyone had volunteered; most were keenly interested in the progress of the vehicles and in the opportunity to view the Arctic. The promise of 14 days leave on completion of "Musk Ox" helped; so did a daily two-ounce rum ration.<sup>9</sup>

Not surprisingly, "Musk Ox" resources were used to assist civilians. Several mercy flights transported sick and injured people to Churchill and Yellowknife. On 12 March, at Perry River, Captain Croome diagnosed an Inuit child as having a ruptured appendix and operated; on the 14th, Squadron Leader Coombes flew both doctor and patient to Cambridge Bay; the child was forwarded to Norman Wells; Croome waited for the Moving Force to catch up to him; subsequently a grateful family presented Croome with a Siberian husky. The dog was flown to Yellowknife for the duration of the exercise.<sup>10</sup>

Throughout the expedition, Sergeant Williams' diary had recorded various contacts



NAC PA 196944



with northern people - Inuit, RCMP constables, missionaries. His impressions of the Inuit varied. At some stops he complained of natives begging for candy and cigarettes; on at least one occasion he remarked on apparent Inuit insensitivity to the suffering of others. For the most part, however, he admired their fortitude and honesty; on 21 February he had written:

Eskimo girl and her baby came in [to the "Musk Ox" encampment], the babe had an infection in its eye. Seven days old, weighs about 6 pounds, tiny wee mite. Was born in an igloo - the temperature was 30 below at the time. How do they do it? The Eskimo here are of the Padlermint tribe... Seem a very healthy lot; the kids look good too. They all, adults, etc., come to the Mission to see Father Dionne (and us) and he welcomes all and sundry. One man came in - is a rank pagan - but out of respect for the Father he doesn't wear any of the taboo signs.<sup>x1</sup>

Williams also reported assorted impressions of the missionaries. Some had been generous hosts; others had seemed miserly; at one point the local RCMP told him that it was fortunate the missionaries had been absent - "They are only trouble makers while they are here." The clergy, then, were as varied as their flock.

"Musk Ox" reaffirmed what had been learned in wartime - that air and land forces could conduct combined operations. The feasibility of aerial resupply to army units in the Arctic was limited only by the size of the cargoes needed and the number of suitable aircraft on hand. Arctic flying had not proved difficult; serviceability had been another matter, while navigation had been complex, with compasses increasingly unreliable as one approached the North Magnetic Pole.

Scientific benefits aside, the exercise provided the forces with an enormous public relations boost just when budgets and civilian interest were most threatened. Earlier schemes such as "Eskimo" and "Polar Bear"<sup>12</sup> had been overshadowed by wartime events, even though they had been filmed and photographed extensively. "Musk Ox" differed from the outset. Even before it began, dignitaries and diplomats visited the Churchill site in such numbers that participants considered the "brass" as getting underfoot. The exercise was the subject of daily news reports; the National Film Board produced

a 55-minute documentary; newspaper editorial writers discussed its importance at length.

"Musk Ox" was conducted before the Cold War had truly begun; foreign military observers had included Soviet officers. Nevertheless, it heralded future concerns for Arctic defences; the Canadian forces would increasingly concentrate on developing equipment and methods appropriate to northern warfare; creation of a brigade-strength Mobile Striking Force operating "north of 60" preoccupied military planners until the early 1950s, when the Korean War and commitments to the North Atlantic Treaty Organization diverted interest, men and materiel to foreign theatres.<sup>13</sup>

### Notes

1. Diary of No.1 Air Supply Unit, on microfilm at the Directorate of History and Heritage, National Defence, Ottawa (DHH) and held as National Archives of Canada (NAC) microfilm C-12396.
2. For further information see Hugh Halliday, "Recapturing the North: Exercises 'Eskimo,' 'Polar Bear,' and 'Lemming,' 1945," *Canadian Military History*, Vol.6, No.2, Autumn 1997, pp.29-38.
3. The diary kept by Private Regimbai forms part of DHH document 72/804, "Personnel Selection Research Report" for Exercise Musk Ox.
4. DHH 72/804, "Personnel Selection Research Report" for Exercise Musk Ox.
5. Canadian Army file BDF Engineers 1-10-2" Operation Musk Ox," held as DHH document 112.3E1.
6. *Ibid.*
7. "Medical Report - Exercise Musk Ox," found in DHH document 114.301009 (D.31), Interim Reports on Exercise Musk Ox.
8. See note 3, above.
9. DHH document 181.003 (D.1452), "No.1 Air Supply Unit, RCAF, Musk Ox, Final Report." Rum had been issued to soldiers during the 1945 Exercises "Polar Bear" and "Lemming." The matter of rum rations proved contentious later that year in Operation "Investigator."
10. *Ibid.* See also Northwest Air Command File S.204-13, "Operation Musk Ox," DHH 181.002 (D.304), with special reference to No. 1 ASU Weekly Progress Report for the period of 7-13 March 1946.
11. See note 3, above.
12. See Halliday, "Recapturing the North."
13. David A. Charters, "Five Lost Years: The Mobile Striking Force 1946-1951," *Canadian Defence Quarterly*, Spring 1978, pp.44-47.

Hugh Halliday, a regular Contributor to *CMH*, is currently putting the finishing touches on a manuscript dealing with Canadians who have been awarded the Air Force Cross and the Air Force medal.