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Recapturing the North: Exercises “Eskimo,” “Polar Bear” and “Lemming,” 1945

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The day is past when our Armed Forces can afford to suspend operations for the winter months. Space is power only when we can move and fight effectively in that space during all seasons of the year.

Preface to Canadian Army Report on Exercise "Eskimo."[1]

One region of great interest to postwar Canadian forces was the Arctic. This was not a new area for them; the army and RCAF had been active there in the 1920s and 1930s, but the war had expanded the strategic and economic importance of the place. From the winter of 1941-42 onwards, the Canadian Army held trials of assorted cold-weather vehicles, specialized rations and protective clothing. This work proceeded at many sites, but most intensively at Camp Borden, Camp Petawawa and Arvida. Training of groups such as the 1st Special Service Force (a joint Canada/U.S. unit), British commandos and Free Norwegian troops tested some of this materiel. There were considerable exchanges of information and personnel between Canadian and American authorities. Simultaneously, experiences in assorted battle theatres were studied, including the Russian front and Alaska. However, the Canadian Army still lacked a doctrine on either winter or Arctic warfare. There was little information on how large forces using the new gear should be supplied and handled under extremely cold winter conditions.

The Canadian Army was anxious to test equipment and methods which might be employed in the future, whether in northern Europe, northern Asia, or the Canadian Arctic. Colonel W.W. Goforth, Royal Canadian Armoured Corps, was particularly interested. As a weapons development expert he believed that postwar Canada should carve out a specialized niche in winter warfare. His advocacy of this view - and his direction of the Winter Warfare Programme of 1944-1945 - would earn him appointment as an Officer, Order of the British Empire (OBE).

Discussion of an ambitious test program began within National Defence Headquarters as early as May 1944.[2] On 27 July 1944, Lieutenant-General J.G. Murchie, Chief of the General Staff, proposed to the Minister of National Defence (Colonel J.L. Ralston) that large-scale exercises should be conducted the following winter. Murchie was confident that the vehicles and ancillary articles were now of the desired standards to allow men to live, move and fight under Arctic conditions. What was now needed was to ascertain the proper balance of arms and equipment for winter warfare, the mobility of forces operating beyond established bases and railheads, problems that might ensue through aerial resupply, and winter tactics including air/ground co-operation. The Minister approved the proposal on 31 July, accelerating planning and preparation for two major exercises.[3]

Exercise "Eskimo"

In January and February 1945 Exercise "Eskimo" was held in north-central Saskatchewan to look at "dry cold" performance

(i.e. intense cold, low humidity and stable snow conditions). It involved land and air units and was attended by British and American observers. "Eskimo" was to determine the effect of a continental, sub-Arctic winter on the mobility and combat efficiency of all-arms striking forces. Equipment and winterizing aids developed in earlier trials, plus experience from Alaska, Iceland and Europe were all brought to bear. Wartime commitments limited personnel to about 1,750, all ranks, although 569 vehicles were used at one time or another; these included a Ram II tank, several 5 cwt trucks (better known as "Jeeps"), and assorted oversnow carriers. The latter included two crude machines (one with an air-cooled engine, the other a liquid-cooled power unit) officially designated as a "Snow Tractor, T-27," a precursor of the "Ski-doo." It was reported as having good oversnow performance but "insufficiently rugged in design." Another odd vehicle was the "Snow Tractor, T-36" which broke down after twelve miles of travel on a ploughed road. Other equipment tested was as diverse as beard clippers, goggles, and assorted tents.[4]

The main exercise consisted of an advance 183 miles northward of Prince Albert followed by a withdrawal along the same route. The terrain consisted of an undulating plain interspersed with lakes and muskeg. Snow cover averaged 18 inches. The site had been chosen for its mean seasonal temperature (-1° to -11° F); during "Eskimo" the actual temperatures varied from -34° to + 38° F.

"Eskimo" was more to test materiel than men. The force was a skeletonized Brigade Group, small in numbers but representing all combat arms. The infantry component, drawn from the King's Own Rifles of Canada (a Saskatchewan unit in Canada's home army) was only 325 officers and men; most of the remaining personnel were specialists operating the gadgetry of war - signals, engineering, transport, artillery, and medical equipment. After the infantry, the largest single group were Royal Canadian Engineers (193, all ranks). Curiously, although "Eskimo" equipment included several armoured fighting vehicles, these were operated by Royal Canadian Army Service Corps personnel; virtually no members of the Armoured Corps were assigned.

Even an exercise of this sort generated volumes of paper, some of it concerning unexpected topics. Much attention was devoted to assembling foreign observers; both the Americans and the British were keenly interested in both exercises. The National Film Board was asked to record the proceedings. A memo dated 4 November 1944 declared five establishments as "out of bounds" to military personnel - the Prince Albert Breweries, three cafes and a designated rooming house.

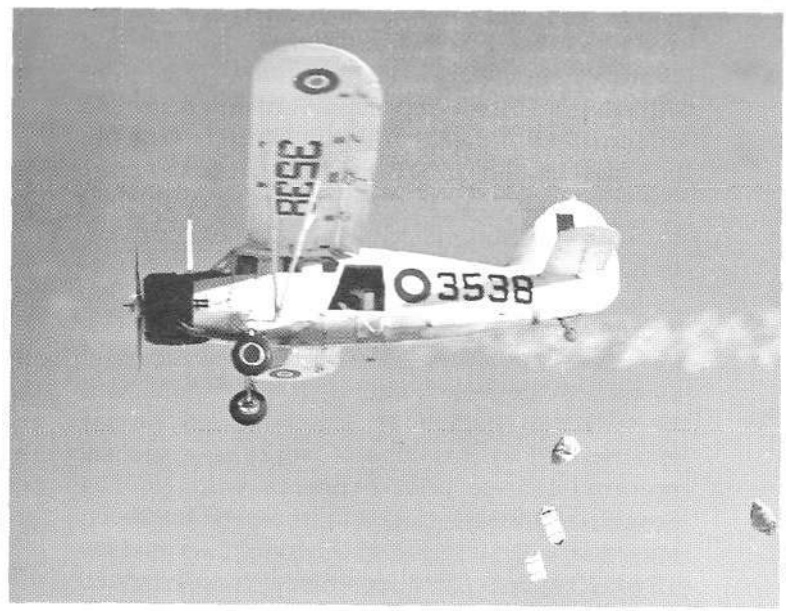
A portion of "Eskimo" entailed movement through Prince Albert National Park, the responsibility of the Department of Mines and Resources. A two-page agreement signed with that department listed numerous acts prohibited to the army. No game was to be destroyed; bridges were to be reinforced if crossing vehicles exceeded the load capacity of the structures; heavy tanks would by-pass bridges altogether; firing live ammunition was limited to certain areas defined so that shells would fall outside the park area; no vehicles would be allowed on the golf course.

Every such operation was accompanied by a scenario - a fictitious set of events that gave the appearance of a real battle and placed the various activities into some context. It had to conform to the reality of field conditions (including available troops, terrain and equipment) but otherwise it did not have to correspond with strategic realities. Writing of this "plot" began with the initial planning of the exercise, when it was suggested that the Japanese had decided to attack Siberia with a diversionary raid on northern Canada. By early 1945 this had been refined and modified; the scenario as adopted was as dramatic as it was improbable:

> (a) Japanese forces, in an ambitious effort to divert Allied resources from the current campaigns in the Philippines and Burma, and to restore lagging morale on their home front, have launched a surprise amphibious and air-borne thrust through Alaska and Northwest Canada. All principal airfields have been seized down to a line Grande Prairie-McMurray. Relatively small advance guard airborne detachments are being rushed further south and east to interfere with Canadian-U.S.A. counter-measures.

NAC PA 195901

NAC PA 195906



NAC PA 195905

Exercise "Eskimo" *(Clockwise from top left): A soldier outfitted with a packboard; Attack at Montreal Lake, SK by "O" Group, King's Own Rifles of Canada; A Norseman drops supplies; Norseman aircraft on skiis prepare for a mission; Laying line by snowmobile.*

NAC PA 195904

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(b) On 13 January 1945 a Japanese airborne force of approximately one Japanese battalion overwhelmed the Airfield Defence Unit at Lac la Ronge and seized the airfield. Additional airborne troops are being landed.

(c) The enemy does not enjoy air superiority in general but it can be expected that he will have local air superiority.

Commencing in early November, Canadian forces had marshalled at Prince Albert, occupying the buildings recently vacated by No. 122 Canadian Army Basic Training Centre. Two months' training was anticipated to toughen the men, but this was set back as the demands of overseas units took precedence over domestic exercises. Moreover, support services staff had been planned on the assumption that 1,175 officers and men would be fed and housed. As planning went forward, however, additional observers (American, British and Canadian) and technical specialists appeared, packing available accommodation until Brigadier M.H.S. Penhale, the overall Director of the scheme, felt compelled to request additional clerks, cooks and drivers to handle the expansion.

As of 16 November 1944 an RCAF Army Co-operation Unit was formed at Prince Albert to assist with Exercise "Eskimo." It was commanded by Squadron Leader C.H. Stover; fittingly, he was experienced in this type of work; as a tactical reconnaissance pilot overseas with No.414 Squadron (Mustangs and Spitfires) he had been awarded a Distinguished Flying Cross in May 1944. His pilots included at least two decorated combat veterans of similar army co-operation work overseas - Flight Lieutenants A.S. Collins and AT. Carlson. Like the army component, the RCAF unit was housed in quarters vacated by a training organization (No.6 Elementary Flying Training School, which had become redundant following reductions in the British Commonwealth Air Training Plan). The principal aircraft used was the Noordyn Norseman, regularly operating on skiis. However, a few other types were added for photography and target towing duties; a Douglas Dakota supplied with its crew by the RAF was reputed to have flown in support of the Normandy landings the previous June. Other types were flown in for special duties such as mock attacks.

"Eskimo" began at dawn on 16 January 1945 with the Canadian force, spearheaded by a reconnaissance party and road building detachments, moving north. The Brigade Group was commanded by Colonel D.C. Stephenson. In the make-believe world of "Eskimo," the principal force moved along Provincial Highway No.2, with flanking parties moving through the bush on either side, providing protection against hidden enemies. The speed of these flanking parties set the real pace of the exercise. Progress was slow. Soldiers moving on snowshoes could not do better than 16 miles in a day, those on skiis could advance 25 miles per day, and the speed of both was inhibited by their dragging toboggans with supplies. Several mock skirmishes were fought with make-believe opponents, variously described as "enemy (theoretical) airborne forces" and "enemy (theoretical) ski patrols"; towed targets became "enemy tanks" for Canadian gunners to engage.

Near Listen Lake, on the 29th, with night falling, the Brigade Group attempted to park in an area cleared by engineers but with muskeg not completely frozen. Several wheeled vehicles bogged down. To regain mobility, the remaining vehicles parked in the open at the edge of the highway. Two Norseman and one Anson aircraft bombed the main force with soot and flour bombs, scoring numerous hits. The incident underlined the importance of tracked vehicles which would not have been so immobilized or exposed.

As just noted, RCAF aircraft played both "friendly" and "hostile" roles. Some machines were loaned by research and training elements. The diary of the RCAF Army Co-Operation Unit (dated 23 January 1945) described a particularly busy day as numerous units participated in diverse roles:

> V.I.P. party still at Waskesiu with "Eskimo" ground forces. Mitchell aircraft arrived from RCAF Station, Suffield, Alberta, to lay smoke screen for mock exercises there. Bolingbroke aircraft arrived from No.5 Bombing and Gunnery School, Dafoe, for air to ground firing exercise. Recce made of area with smoke screen. Photo recce made of attack of force "Eskimo" on supposed Jap positions on Montreal Lake. V.I.P.'s taken on trip for aerial view of Lac la Ronge. Ten Harvard aircraft from No. 13 Service Flying Training School arrived at unit for mock bombing run to be made for V.I.P.'s at Waskesiu. The attack was made at 1100 hours. Smoke screen was laid by B.25 [Mitchell], and then nine

> of the Harvards from North Battleford bombed the "Jap" positions, using 11-pound practice bombs High Explosive. Drogue towing Bolingbroke from Dafoe then appeared and artillery shoot was carried out by light Anti-Aircraft, at the drogue towed by Bolingbroke.[5]

At least one tactical innovation was tried when two American B-17 Fortresses dropped 500-pound bombs on frozen lakes to see If such tactics would disrupt travel across the ice. Even allowing for the limited number of aircraft, the results were not encouraging; the bombs made relatively small holes without buckling the surface; heavy vehicles could still be supported by the ice. Another American experiment during "Eskimo" seemed more promising; a Dakota was used on February 1st to lay two and then four miles of telephone wires; on 4 February nine miles of wires were laid by this method through swamp and bush land.

On 3 February, Lac la Ronge was "liberated." However, it was assumed that the enemy continued to reinforce vigorously, necessitating a "fighting retreat" which began on 10 February and concluded on the 20th. "Eskimo" wound up with a marchpast before Brigadier G.A.H. Trudeau in Prince Albert on 25 February; eight aircraft, led by a Dakota, performed a flypast. On that day the force came as close as it ever would to encountering a real enemy; an aircraft was despatched to Porcupine Plains to retrieve the remains of a Japanese incendiary balloon discovered there.

Exercise "Polar Bear"

"Eskimo" had been arranged to test "dry cold" effects on men and materiel; a comparable trial was needed under "wet cold" conditions (relatively higher temperatures where greater humidity and transitions from snow to mud were more frequent). This program, dubbed Exercise "Polar Bear," was held in northern British Columbia in February and March 1945, using some 1,150 soldiers of the 6th Division. The largest single body - 313 officers and men - were drawn from the 1st Battalion, Prince Albert Volunteers, representing an infantry force; this Reserve Army unit had been mobilized in March 1942 for service in British Columbia. The balance of "Polar Bear" troops were drawn from all arms of the Canadian Army, including medical, signals, armoured, artillery, engineering and transport units. As with "Eskimo," the largest group after infantry was the Royal Canadian Army Service Corps (181 all ranks). A detachment of Dakota and Norseman aircraft also participated.[6]

"Polar Bear" proper was preceded by four weeks assembly and training at Wells, British Columbia. In particular, the men were instructed in snowshoeing and living in the open (no tents) under winter conditions. Colonel M.D. Robertson (Prince Albert Volunteers) commanded the force; Brigadier G.A. McCarter directed the exercise in all its aspects.

As with "Eskimo," a scenario was needed for "Polar Bear." This one, composed in August 1944, was an example of fanciful assumptions prefacing a realistic test programme:

> Action will be based on reports of a Japanese force having been landed at Bella Coola from submarines, having rendered useless RCAF installations at Bella Bella, and giving positive indication that this force is composed in great part of construction personnel with a comparatively small protective element; the assumption being that it will try to construct a useable road from Bella Coola to permit movement inland of a larger fighting force to follow at some later date.[7]

The exercise itself was conducted in three overlapping phases. Between 12 February and 5 March the force moved from Prince George to Anahim Lake, chiefly using an array of motor transport but with some pack horses. The second phase ran from 4 March to early April. This was a series of marches from Anahim Lake to Bella Coola and return; a secondary force of 19 men split off from the main body and, travelling by snowmobile and snowshoe, traversed the Rainbow Mountains to Bella Coola; on the return march this detachment was increased to 120 men and dubbed "Y" Force. The third phase was removal of all troops by vehicle from Anahim Lake to Williams Lake. In the course of "Polar Bear" the troops fought three small mock battles (on 20 February, 11 March and 16 March) against imaginary "hostiles" who were deemed to be blocking passage of the troops. These gave participants welcome opportunities to fire weapons up to the size of a 75 mm pack howitzer.

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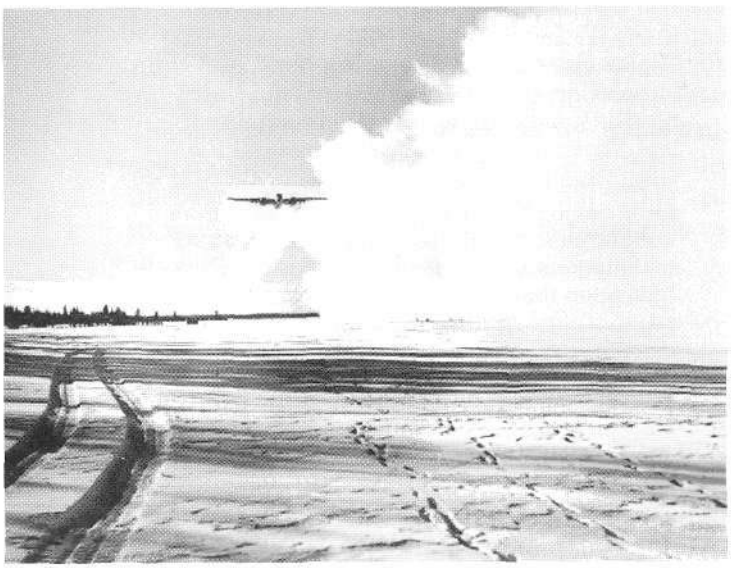
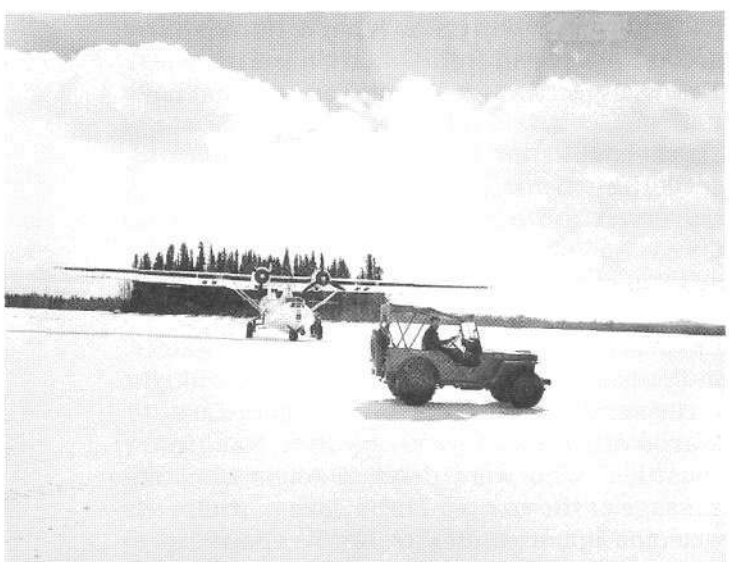


NAC PA 195903

Exercise "Polar Bear" *(Clockwisejrom top left): Trail above Atnarko; Pack horse negotiating a trail through the mountains; The Travois method of moving artillery; A Consolidated Canso on Anahim Lake; Laying a smokescreen by air.*



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Unlike "Eskimo," which had dealt with fairly simple terrain (flat boreal forest), "Polar Bear" was conducted in a setting of complex topography and climate - coastal plateau and mountains, simple road grids to primitive trails, no snow on the coast but six feet of it in the interior. Travelling and living conditions varied according to whether the troops were moving by road or on snowshoes. A report described Phase I as follows:

> A typical day began with reveille at 0700 hours. Units moved off from 0900 on, depending on their order of march. During this period of at least two hours, men dressed, ate their meals (prepared at kitchens and brought back to group fires for reheating), broke camp and loaded vehicles. Halts were frequent due occasionally to road trouble, but generally to allow the Reconnaissance Troop to complete a bound and establish a section of the route as clear. During these halts, men in trucks and jeeps were able to get out and move around. Lunch consisted of cold sandwiches and occasionally hot meals or drinks serviced from the unit kitchen trucks. Halt was generally made from 1500 to 1700 hours. Troops then made their bivouacs using signal tents (4-man) or 6-man tents, cut firewood, ate supper, and established themselves for the night.

The routine in the second phase was much more arduous, although veterans of winter battles and even modern exercises might find it less than demanding (most of the troops were conscripts). A typical marching day began at 0600 hours, with scouts moving out at 0745 hours and the main body starting 15 minutes later. Most soldiers carried standard infantry weapons and a 45-pound pack of food, messing equipment, socks, etc. A day's march was approximately 14 miles; the routine consisted of a 20-25 minute movement followed by five to ten minutes rest before resuming the march.

Supporting "Polar Bear" was a small RCAF detachment directed by Wing Commander R.I. Thomas, AFC. As a photo survey pilot in the 1930s, he had gained experience in frontier flying; as of 1945 he had flown roughly 2,500 hours. His force, headquartered at Prince George, was equipped with Norseman, Ventura and Dakota aircraft. During the exercise they operated at various times from Williams Lake, Vanderhoof and Quesnel. During the initial training phase the air force practised free-fall supply drops using boxes of ashes; the stain left on snow showed clearly the crews' aiming accuracy. An early practice bombing trial was frustrated because white smoke projectiles - indistinguishable from snowy terrain - were used. One report from the pre-exercise period demonstrated the efficiency of the aircrews and Thomas's own sense of humour:

> On the 27th January, a supply dropping exercise was carried out in conjunction with Army manoeuvres at Wells. No attempt was made to show how much could be dropped, stress being laid on the variety of commodities which could be delivered safely, and also the type of make-shift parachutes which could be devised. Eggs were the most fragile articles, and landed without breakage. It was reported that one of the A.L.O.'s [Aerial Liaison Officers] had to break an egg to convince sceptics that they were not frozen. A bell tent was used to drop one bundle to show how far it was possible to go with improvising. Unfortunately a pair of large ladies' bloomers failed to safeguard a bottle of eastern beer for Brigadier Campbell, VC, DSO.[8]

The exercise tested many techniques that particularly interested the RCAF, notably snow compacting to establish landing strips in open country. Unfortunately, several tractors broke through lake ice while preparing such sites, and although no lives were lost, the retrieval of the vehicles proved time consuming. A series of supply drops from 4,000 feet, 5,000 feet and 6,000 feet were disappointing; upper winds scattered the cargo bundles. It was concluded that high-level drops should be conducted only when turbulence made it impossible to enter the valleys; even then, parachute openings would be delayed to ensure minimum dispersal. On two occasions a jeep was dropped by parachute. The first test appears to have succeeded but the second failed when none of the parachutes opened fully and the vehicle was reduced to rubble.

"Polar Bear" presented the air force with some unusual tasks, since it was probably the last major army exercise to make extensive use of pack animals. On February 21st and 23rd aircraft delivered a total of 210 hay bales and 4,400 pounds of oats to Tatla and Kleena Kleene. Additional feed deliveries were made in March. They were not without incident; the aircraft descended into turbulent canyon air currents; on at least two occasions hay bales struck the tailplanes of Dakota transports. Flight Lieutenant J.H.A. Lougheed was later commended for his role in these drops.

Unlike "Eskimo," however, attempts at tactical air support missions during "Polar Bear" were both modest and disappointing. The Venturas scouted for non-existent enemies; a mock strafing attack "to permit Observers to note the effect of .50 calibre fire on the various parapets" was cancelled due to weather and not rescheduled. When drafting the final report on "Polar Bear," staff officers wrote that "insufficient use was made of tactical support to justify any conclusions."

"Polar Bear," more than "Eskimo," demonstrated the limits of soldiers working in demanding conditions. The problems were not those of survival but of endurance. Men struggling through snow and rugged terrain while packing or dragging their own supplies would not be fit to work or fight. The alternatives would be to provide extensive transport - wheeled, tracked, or pack animals (assuming the presence of roads or suitable vehicles) or resort to frequent aerial re-supply (which could not always be assured, given limits imposed by range and weather).

Staff officers were writing assessments even before the final wrap-up. Ultimately, in the case of "Eskimo," they produced three volumes of conclusions and recommendations. The report on "Polar Bear" was more modest (one volume). The latter analysis noted that the exercise had been more a test of mountain than winter warfare. Apart from technical evaluations of equipment, ranging from skiis and rations to vehicles and ammunition, both reports stressed the validity of long-standing principles set out in basic field manuals, such as the importance of camouflage. Both recognized the limitations of learning from exercises using minimal forces and no realistic "enemy" simulation.

Exercise "Lemming"

Even before the conclusion of these two exercises, the Army had decided to following through on "Eskimo" by conducting a smaller tactical scheme under more northern conditions. The Chief of the General Staff wrote to the Minister of National Defence on 15 February 1945, outlining a test of oversnow vehicles on the Barren Grounds and sea ice. One striking difference between this and the earlier exercises was that it would have a civil as well as a military application. The Department of Mines and Resources was contemplating the use of such vehicles to supply survey parties on Victoria and Banks Islands in the winter of 1945-46, in contemplation of ground control of subsequent northern aerial surveys.[9]

Exercise "Lemming" (22 March to 6 April 1945) involved a convoy of six vehicles (two Canadian Armoured Snowmobiles Mk.I, two M29 cargo carriers, two M7 snow tractors plus ten army sledges and two Inuit-type sleds) moving from Churchill, Manitoba to Padlei, Northwest Territories and return, a round-trip distance of 653 miles. No fictitious combat scenario was composed for this. Its stated objectives were limited but realistic, namely:

(a) To obtain Information of a non-tactical nature by which to extend Canadian Army winter doctrine from sub-Arctic conditions.

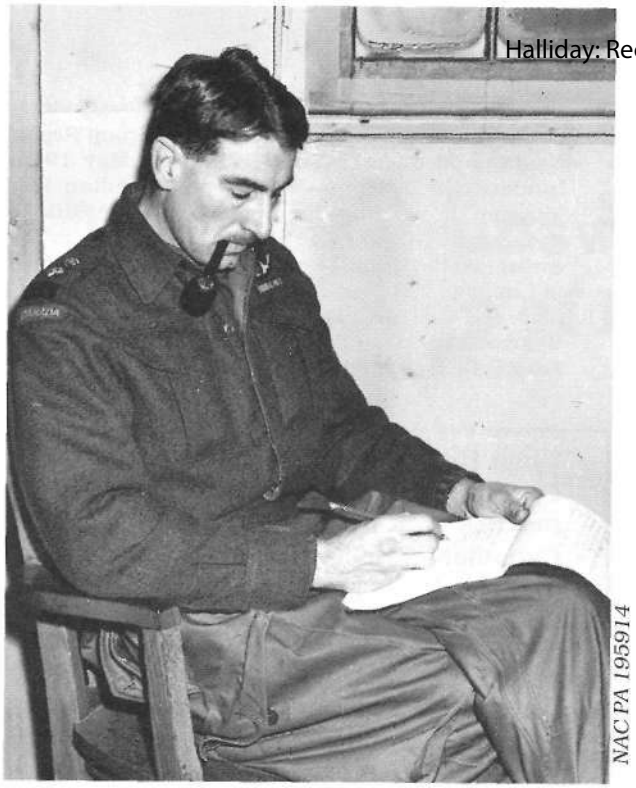
(b) To provide data upon which to base further development of oversnow vehicles.

(c) To explore the barren grounds, as an area for further winter exercises.

(d) To assist civil development and surveys in the barren grounds.

Arctic warfare, it was realized, would differ greatly from winter warfare. The latter, however harsh, involved movement along existing roads or close to railheads. Arctic warfare, on the other hand, would be in vast spaces where units would eitiier have to be self-contained or constantly supplied by air. Investigating the limits of the self-contained column, "Lemming" involved a modest force - only 17 officers, other ranks, and civilian observers (plus one American Army observer); of these, five remained at Churchill in support roles. It was directed by a very experienced officer, Major P.D. Baird, RCA, who had civil experience in the Arctic, had attended Mountain Warfare Schools in Iceland, Scotland, and Alberta, and had participated as an observer in "Polar Bear." He had been pulled from that operation *to* attend "Eskimo" and draw up a plan for "Lemming"; most of his associates had participated in "Eskimo"; Mr. R.J. Kerr had been involved in development of the Canadian Armoured Snowmobile.

The party left Churchill on 22 March 1945, reached Eskimo Point on the 25th, and departed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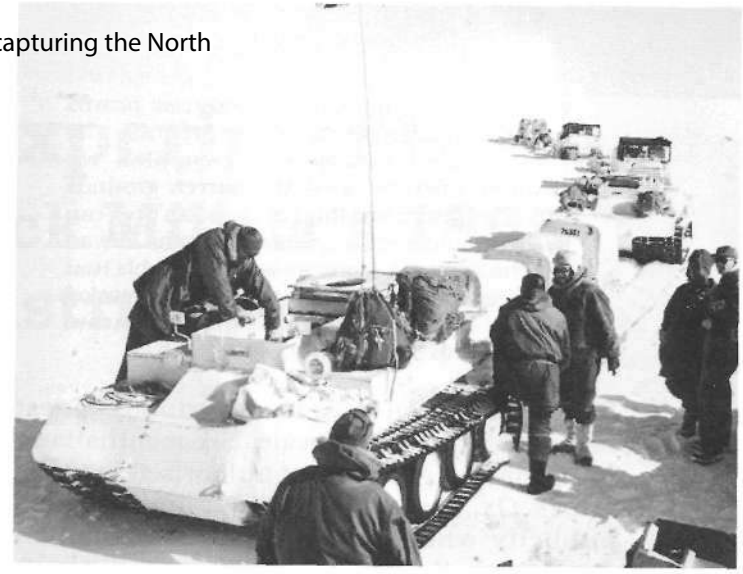
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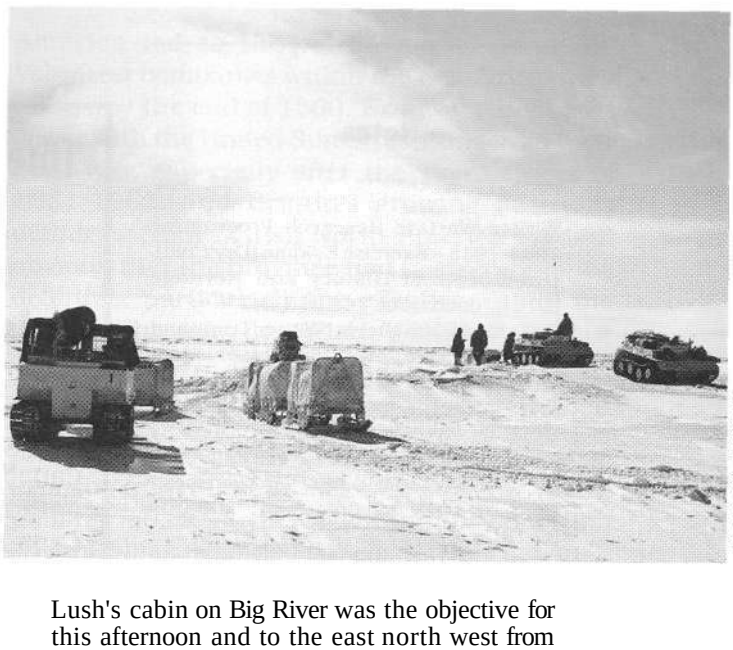
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Above: *Lieutenant-Colonel P.D. Baird, experienced in Arctic operations and mountain warfare, took part in Exercises "Eskimo," "Polar Bear" and "Lemming." The photos contained in this article all came from the Peter Baird Collection at the National Archives of Canada.*

Exercise "Lemming": *Assorted vehicles on sea ice near Churchill, MB (above), and mounting a pressure ridge (below).*

for Padlei on the 27th. They reached their destination late the following day. The return journey commenced at 0715 hours on the 30th; more than 15 hours later they reached Eskimo Point. Two days were spent resting and repairing vehicles. The convoy set out again on 2 April and reached Churchill early on the 6th.

The official report of "Lemming" suggests to a modern reader that the exercise demonstrated the difficulties of Barrens travel without much hope of future improvement. Virtually every day was marked by some problem - stuck vehicles, stripped transmissions, failed radio communications, excessive fuel consumption. Time was lost in frustrating ways. On 24 March, for example, the convoy wasted several hours through a navigation problem which Baird described:

> Lush's cabin on Big River was the objective for this afternoon and to the east north west from this point a square object which was thought to be this was seen. After travelling seven miles overland and within one hundred yards of the object it was found to be a large rock exactly the shape and size of a cabin.[10]

The party camped in the open that night and did not find the elusive cabin until the next day; they estimated they had driven seventeen unnecessary miles. Baird, nevertheless, was an enthusiast, determined to argue that, with technical improvements, the army would be able to move freely in the Barrens. His report was striking in the confidence with which he expressed his conclusions:

> The exercise proved that travel over the Barren Grounds and coastal sea ice in oversnow

> vehicles is not difficult...The exercise proved that the inaccessibility of the Arctic is just another myth and, providing supplies are assured, operations on the barren grounds which represent one third of Canada's area can be as unhindered as operations on the Libyan deserts. It would therefore seem desirable that for defence purposes Canada should develop further oversnow vehicle types and train personnel to operate in these regions.[11]

Balrd would soon have an opportunity to test his views on a larger scale. Six months latei the Canadian government authorized Exercise "Musk Ox," accompanied by unprecedented publicity which would re-focus Canadian attention on the north. But that, as they say, is another story.

Notes

1. Winter Warfare Research Programme 1944-1945 -Exercise Eskimo (Dry Cold), Directorate of History and Heritage (DHH), document 746.013 D.2
2. DND file ARMS 10-11, "Winter Trials and Test Exercises 1944-45," preserved as DHH document 314.009 D.179
3. *Ibid.*, Murchie to Minister of National Defence, 27 July 1944, minuted by Ralston on 31 July 1944; see also DND file RS 4-17-1, "Cold Weather Exercises," held by DHH as document 168.009 (D.13).
4. Canadian Army file 4-17-1 "Cold Weather Exercises - Policy," held by Canadian Armed Forces DHH (Document 168.009 D.13); Canadian Army and RCAF Winter Warfare Programme, 1944-45: Exercise Eskimo (see note 1).
5. Diary of RCAF Army Co-Operation Unit, Prince Albert, held in National Archives of Canada (microfilm C-12396).
6. Unless otherwise stated, information on Polar Bear is drawn from Canadian Army Operational Research Group Report No.28: Exercise POLAR Bear (DHH document 746.083 (D.20).
7. "Exercise Polar Bear - Description of Operation," found in Volume Three of Canadian Army flle619-l-12 "Training: Combined Operations," filed with DHH as document 169.012 (D.35).
8. DHH document 746.009 (D.2), Weekly Progress Reports of "Polar Bear," RCAF Detachment. Unless otherwise noted, this is the source of all information on the RCAF's role in Polar Bear.
9. See note 2.
10. Canadian Army Operational Research Group Report No.25 - Exercise Lemming, dated 24 May 1945; (uncatalogued document held in Canadian War Museum Library, Vimy House); also filed with DHH as document 746.083 (D.19). This report refers to the earlier exercise, Polar Bear; several of the vehicles used in Lemming had been driven in Polar Bear.
11. *Ibid.;* see also Canadian Army file RS-4-17-2 "Cold Weather Exercises - Policy," held by Canadian Armed Forces, DHH (168.009 D.13).

Hugh Halliday, a regular Contibutor 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.