

TRACKS NORTH

The Story of Exercise Muskox



John Lauder

Edited and Introduced by

P. Whitney Lackenbauer and Peter Kikkert

Arctic Operational Histories, no.5

TRACKS NORTH

The Story of Exercise Musko

© The author/editors 2018

Mulroney Institute
St. Francis Xavier University
5005 Chapel Square
Antigonish, Nova Scotia, Canada
B2G 2W5

LIBRARY AND ARCHIVES CANADA CATALOGUING IN
PUBLICATION

Tracks North: The Story of Exercise Muskox / John Lauder, author / P.
Whitney Lackenbauer and Peter Kikkert, editors

(Arctic Operational History Series, no. 5)

Issued in electronic and print formats

ISBN (pdf): 978-1-7753409-7-3

ISBN (paper): 978-1-7753409-7-3

1. Canada. Canadian Armed Forces—History--20th century. 2. Operations--
Canada, Northern--History. 3. Canadian Army--History. 4. Royal Canadian
Air Force--History. 5. Canada, Northern--Strategic aspects. 6. Arctic regions--
Strategic aspects. 7. Canada, Northern—History—20th century. I. Lauder,
John, author II. P. Whitney Lackenbauer, editor III. Peter Kikkert, editor IV.
Mulroney Institute of Government, issuing body V. Tracks North: The Story of
Exercise Muskox. V. Series: Arctic Operational Histories no.5

Page design and typesetting by P. Whitney Lackenbauer

Cover design by Jennifer Arthur-Lackenbauer



Please consider the environment before printing this e-book

TRACKS NORTH

The Story of Exercise Muskox

John Lauder

Edited and Introduced by

P. Whitney Lackenbauer and Peter Kikkert

Arctic Operational History Series, no.5
2018

The Arctic Operational History Series

The Arctic Operational History Series seeks to provide context and background to Canada's defence operations and responsibilities in the North by resuscitating important, but forgotten, Canadian Armed Forces (CAF) reports, histories, and defence material from previous generations of Arctic operations.

Since the CAF's reengagement with the Arctic in the early 2000s, experience has demonstrated the continuity of many of the challenges and frictions which dominated operations in decades past. While the platforms and technologies used in previous eras of Arctic operations are very different, the underlying challenges – such as logistics, communications, movement, and sustainment – remain largely the same. Unfortunately, few of the lessons learned by previous generations are available to today's operators. To preserve these lessons and strengthen the CAF's ties to its northern history, this series is reproducing key reports and histories with direct relevance to CAF operations today.

Adam Lajeunesse
Series Editor

Exercise Muskox, in 1946, was the first attempt by anyone to use motorized land vehicles in the high Arctic. Aircraft had done some freight hauling, but as there were no accurate maps of the North, flying was limited. Bombardier had designed an over-snow machine for the planned wartime invasion of Norway, which had never happened, so the military was anxious to run tests. Washington and London were getting suspicious of their former ally, Russia, so backed the plan and offered support.

47 men in snowmobiles (these resembled tanks, and were not like the present-day machines) set out from Churchill to go north to the Arctic Islands, and then move south down the [Mackenzie] Valley to Edmonton. To support the force some 500 Army and Air Force troops were stationed at various bases across the North. Fighting blizzards, then spring floods and dust storms, the group made the 3,200 mile trek in 81 days, fudging at the end to ride the last 407 miles on the train. It might be considered as a Canadian “Charge of the Light Brigade”, except that cannons did not do them in, but the mechanical failures of their own machines.

John Lauder to Directorate of History,
Department of National Defence, 1991¹

¹ John Lauder, letter, no date (spring 1991), DHH 96-52.

Acknowledgements

We would like to acknowledge the Social Sciences and Humanities Research Council of Canada for its financial support through Insight Grant 435-2015-1140. A special thanks as well to Dr. Adam Lajeunesse, the Irving Shipbuilding Chair in Canadian Arctic Marine Security Policy with the Mulroney Institute of Government at St. Francis Xavier University, for inviting us to publish this work through the Arctic Operational History Series.

P. Whitney Lackenbauer and Peter Kikkert
December 2018

Contents

INTRODUCTIONi

 Editors’ Note xiv

List of Acronyms..... xix

1. SEARCH FOR SOVEREIGNTY.....1

2. BASICS AND BASES8

3. LEADERS, VIPS AND OTHERS.....14

4. BAKER LAKE OR BUST21

5. RUMINATIONS.....28

6. THE FORCE MOVES34

7. BAKER LAKE TO PERRY RIVER.....42

8. MAGNETIC MISSION48

9. CAMBRIDGE BAY TO FORT NORMAN52

10. SIC ITUR AD ASTRA ETC58

11. FORT NORMAN TO EDMONTON.....62

12. LESSONS LEARNED AND LOST72

Further Readings.....78

INTRODUCTION

P. Whitney Lackenbauer and Peter Kikkert

On 12 October 1945, Minister of National Defence Douglas Abbott approved a non-tactical winter exercise set to take place in the Canadian Arctic and sub-Arctic between February and May of the following year. Exercise *Musk Ox* called for a small force travelling in snowmobiles to move overland from Churchill to Edmonton via Cambridge Bay, Kugluktuk (Coppermine), and Tulita (Fort Norman), while being supported and supplied by the Royal Canadian Air Force (RCAF) primarily flying out of Churchill, Yellowknife, Fort Nelson, Norman Wells and Edmonton, and an additional force deployed to Baker Lake. Canadian planners designed *Musk Ox* to study movement and maintenance in a wide spectrum of cold weather conditions and terrain, while testing out Army-Air Force cooperation, the mobility of over-snow vehicles, methods of air supply and “certain technical research projects related to Arctic warfare” (including the collection of snow and ice data, meteorology, navigation, magnetic observations and ground topography).

After months of planning and training, the Moving Force set off from Churchill on 15 February 1946. Watching the force depart was John Lauder, a Government of Canada meteorologist who had been temporarily stationed at Churchill Base in support of the exercise.¹ Decades later, Lauder summarized the expedition:

The trek was completed in 81 days, with only a slight bit of fudging when the railway was used as the means of travel for the final leg. For various reasons no movement was possible on 29 of these days, so only 52 travel days were used for the 3,279 mile (5,279 km) trip. The path was made of snow, ice, tundra, bush, corduroy road, mud, gravel, and even water. Weather conditions ranged from blizzards to dust storms, and temperatures went to extremes at both ends of the scale. Mechanical emergencies,

¹ John Lauder “spent his entire working career as a meteorologist with the government of Canada. He began as a meteorological briefing officer for pilots being trained at various air bases in Manitoba at the outset of WWII and later worked for long periods in the met offices in Edmonton and Winnipeg. In the early 1960's he served in the Canadian Air Force as met officer at 2 Wing in north-eastern France.” “John Lauder Obituary,” *National Post*, 16 January 2006.

inexperienced personnel, inaccurate maps and limited communications all offered problems. These were exacerbated by bureaucratic bungling by higher headquarters, so it is amazing that the troops completed their journey at all, let alone made it to Edmonton only one day late.

Lauder believed that *Musk Ox* represented a significant achievement in Canada's military history and an important moment in the development of the North – as such, he thought it deserved a proper recounting. This feeling was reinforced when he heard of a radio interview involving Dr. J. Tuzo Wilson, in which the director of *Musk Ox* suggested that someone should write a book about the exercise.² In the late 1980s, Lauder took this suggestion as his new marching orders.

Lauder sent letters to many of the principal participants in the exercise, including Tuzo Wilson and the leader of the Baker Lake Force, Graham Rowley, informing them of his book project and asking them to share historical materials or personal accounts.³ Tuzo Wilson responded that *Musk Ox* and other interwar and postwar “Arctic trips as preceded the D.E.W. Line should be written up.”⁴ Encouraged, Lauder collected an array of primary sources: official Canadian Army, RCAF, and U.S. Army reports (most of which had been classified as “secret” or “confidential” when they were written in 1946 and were not declassified until the 1980s); newspaper coverage of the exercise; and three participants' personal diaries. He also knew five of the six meteorologists on the expedition and was able to contact each of them for their reminiscences.⁵ Lauder, who had served as a meteorologist at Churchill Base and Norman Wells during *Musk Ox*, brought his own recollections as well.

In 1991, Lauder reached out to the Directorate of History (now Directorate of History and Heritage) at the Department of National Defence to seek advice on how to go about publishing his history, *Tracks North: The Story of Exercise Musk Ox*. “This was certainly an important event in Canadian military history, and it probably merits a full-length book treatment,” official historian Carl Christie replied. He recommended that Lauder contact a potential publisher directly, but he cautioned that “these are not easy times for publishers. We

² John Lauder to J. Tuzo Wilson, 21 October 1987, B-93-0050, Box 52, File 1986, Arctic Projects, University of Toronto Archives (UTA).

³ Lauder to Wilson, 21 October 1987.

⁴ J. Tuzo Wilson to John Lauder, 16 November 1987, B-93-0050, Box 52, File 1986, Arctic Projects, UTA.

⁵ John Lauder to J. Tuzo Wilson, 12 January 1988, B-93-0050, Box 52, File 1986, Arctic Projects, UTA.

cannot pretend that it will be easy [to get it published], but we wish you luck.”⁶ There is no indication that Lauder ever received a favourable response to inquiries that he may have made. Lauder passed away on 28 November 2005.

In the course of researching our own history of *Musk Ox*, we came upon a copy of his manuscript in the files of the Directorate of History and Heritage. In the interests of ensuring that Lauder gets the credit that he deserves for his pioneering research, we have decided to publish his manuscript as part of the Arctic Operational History series. While Lauder drew upon a strong source base, his draft book was intended for a popular audience and did not contain any footnotes. Nevertheless, his account offers a strong narrative overview of the exercise from its inception to the accumulation of lessons learned after the Moving Force reached Edmonton. Lauder effectively captures many of the themes and observations discussed in exercise reports and the personal recollections of various participants. Accordingly, we have kept our introduction brief, merely intending to frame and contextualize Lauder’s narrative.

Northern Awakenings⁷

The global nature of the Second World War generated a growing awareness in Canada that winter and northern warfare was no longer something that could be overlooked. In his landmark 1940 study on *The Military Problems of Canada*, historian C.P. Stacey dismissed any threat to the dominion from the north, thanks to “those two famous servants of the Czar, Generals January and February, mount guard for the Canadian people all year round.”⁸ Within a year, however, the Russo-Finnish War and the German campaigns in Russia prompted professional soldiers to seriously consider the challenges of mounting

⁶ Carl Christie for W.A.B. Douglas, 17 June 1991, Department of National Defence, Directorate of History and Heritage (DHH) 96-52.

⁷ This section is largely derived from the introduction to P. Whitney Lackenbauer and Peter Kikkert, eds., *Lessons in Arctic Operations: The Canadian Army Experience, 1945-1956*, Documents on Canadian Arctic Sovereignty and Security (DCASS) No. 7 (Calgary and Waterloo: Centre for Military, Strategic and Security Studies/Centre on Foreign Policy and Federalism/Arctic Institute of North America, 2016). See also Lackenbauer, Kikkert, and Kenneth Eyre, “Lessons in Arctic Warfare: The Canadian Army Experience, 1945-55,” in *Canadian Armed Forces Arctic Operations, 1945-2015: Historical and Contemporary Lessons Learned*, ed. P.W. Lackenbauer and Adam Lajeunesse (Fredericton: Gregg Centre for the Study of War and Society, 2017), 47-104.

⁸ C.P. Stacey, *The Military Problems of Canada* (Toronto: Ryerson Press, 1940), 5.

military operations in winter.⁹ In response, Canada began to contemplate the problems of cold and mobility when it developed its first winter warfare training pamphlet on *Instructions for Winter and Ski Training* in 1941. The many problematic insights that it offered, such as directing soldiers to briskly rub frostbitten limbs with snow to restore circulation, reveal that Canada's "northern-ness" did not inherently translate into ready-made aptitude for Northern operations.¹⁰

As historian Kenneth Eyre explained, worries over the capability of the Canadians and Americans to respond to an enemy attack in northern North America during the war prompted Canada to lead "her Western allies in the development of specialized equipment and techniques for winter warfare."¹¹ The Canadian Army opened a winter warfare school in Petawawa, Ontario during the winter of 1941-42, where it conducted experiments on the effect of snow and cold. Researchers tested power-driven toboggans and adopted adaptor kits to "arcticize" vehicles so that they could continue to operate at temperatures as low as -40°C. In 1942, the planning of Operation *Plough* inspired greater Allied interest in winter operations, and Canada continued to press on with various experiments even after that plan was scuttled.¹² At Shilo, Manitoba, the Army experimented with vehicles and weapons in extreme cold, tested transportation capabilities across ice and snow and developed special clothing

⁹ For an introduction to Swedish, Russian, German, American, British, and Canadian interests, see Major K.C. Eyre, "Tactics in the Snow: The Development of a Concept," *Canadian Defence Quarterly* 4/4 (Spring 1975), 7-12.

¹⁰ Canadian Army Training Pamphlet No.6, *Instructions for Winter and Ski Training* (Ottawa: King's Printer, 1941).

¹¹ Kenneth Eyre, "Custos Borealis: The Military in the Canadian North" (unpublished Ph.D. thesis, University of London - King's College, 1981), 150. Prior to the Japanese capture of Attu and Kiska in June 1942, the U.S. Army did not consider the Arctic to be of primary importance and naively assumed that a mountain trained unit could operate in cold weather anywhere. The Japanese invasion, however, convinced the U.S. Army that it had to improve its arctic capabilities. Shortly after, the service established the Alaskan Department Development Board at Fort Richardson, where researchers worked to establish special clothing and equipment for wet-cold and dry extreme cold conditions. Headquarters, Army Arctic Indoctrination School, "Background of Cold Weather Training and Experimentation, US National Archives and Records Administration (NARA), RG 338, Entry 37042, Box 826, File Army Arctic Centre, Arctic Training Doctrine. Early during the war, U.S. Army interest in cold weather operations centred on Camp McCoy, Wisconsin, where units like the 10th Mountain Division trained in winter warfare.

¹² See, Eyre, "Custos Borealis," 150-151.

for both dry and wet cold. By the end of winter 1944, Eyre concludes, “the Canadian military had developed a substantial body of technical knowledge and special equipment related to winter warfare.”¹³

By the winter of 1944-1945, the Western Allies realized that no special winter warfare skills would be required in order to win the wars in Europe or the Pacific. Nevertheless, Canada pressed on with developmental work and the Canadian General Staff proposed “collective and tactical winter warfare tests with skeletonized formations of all arms and services.”¹⁴ These activities also attracted the attention of Canada’s primary allies, Britain and the U.S., who sent observers to the Canadian Army’s exercises that winter: the dry-cold exercise *Eskimo* in northern Saskatchewan, the wet-cold exercise *Polar Bear* in northern British Columbia, and *Lemming* in the barrens between Churchill and Eskimo Point, NWT.¹⁵ Through these wartime exercises, Eyre observed that the Canadian Army took “major steps forward in consolidating its knowledge and capability” for undertaking tactical manoeuvres in winter conditions.¹⁶ The Exercise *Eskimo* report noted that 83% of Canadian territory was classed as Arctic or Subarctic, and suggested that any time invested in training for cold weather operations was well spent.

The last of these exercises, *Lemming*, did the most to inspire *Musk Ox*. Named after the tiny arctic mouse, Exercise *Lemming* lived up to its name in that it was both the smallest and most northerly of the three exercises. Between 22 March and 6 April 1945, a party of twelve men, equipped with two Canadian armoured snowmobiles, two American Weasels, and two American M7 half tracks, ventured into the barrens from Churchill to Eskimo Point, turned inland to the half limit of their fuel and then returned to Churchill.

¹³ Eyre, “Custos Borealis,” 152. See, for example, Wilson, “Winter Manoeuvres in Canada.”

¹⁴ Eyre, “Custos Borealis,” 152. DHH, 112.352 (D7), *Exercise Eskimo*, “Briefing on Exercise Eskimo for Visiting Senior Officers from, U.K., U.S.A. and Canada” (henceforth Ex Eskimo Briefing), 21 January 1945, Appendix 17.

¹⁵ For an overview of the three exercises, see Hugh Halliday, Recapturing the North: Exercises ‘Eskimo,’ ‘Polar Bear’ and ‘Lemming’ 1945, *Canadian Military History* 6/2 (Autumn 1997), 29-38. For more details, see DHH, 746.009 (D17), Ex “Eskimo,” undated (probably summer 1945); Winter Warfare Research Programme, 1944-45 – Exercise Eskimo (Dry Cold), DHH, File 746.013 D2; DHH, 746.083 (D20), Canadian Army Operational Research Group Report 28, “Polar Bear,” 15 July 1945; Exercise Lemming, Lessons Learned: Winter Exercises, 1945-54, DHH 81/675; and Cold Weather Trials: *Exercises Ex Lemming CAORG Report No. 25*, 24 May 1945, DHH, 746.083.

¹⁶ Eyre, “Custos Borealis,” 157.

Lemming was unique in its execution in that the moving force operated entirely self-contained and did not rely upon a line of communication for daily resupply (in sharp contrast to *Musk Ox*). The exercise's planners hoped that the expedition would provide "non-tactical" information that would help round out the winter doctrine that the Army was developing from its other wartime exercises. The terrain encountered over sea ice and the barrens was radically different from that met by the other formations farther to the west. The exercise provided a means of evaluating the utility and reliability of over-snow vehicles in the Arctic and gave an opportunity for the Army to examine the barren grounds.¹⁷ While the requirements of maintenance and rest meant the force only moved for a total of ten days, the participants found movement to be surprisingly easy, with the force covering a total distance of 653 miles (1051 km) – including an impressive 113 miles (182 km) on its best day.¹⁸

In their post-exercise analysis, observers concluded that military operations in the barrens had proven as feasible as they had in the Libyan desert during the war, "providing supplies are ensured."¹⁹ They also emphasized that operational conditions on the barrens were as different from operations in the boreal forest as was the variance between operations in the North African desert and sub-Saharan jungle. Given the virtual unfettered scope for manoeuvre on the winter barrens, the report concluded that "it would therefore seem desirable that for defence purposes Canada should develop further over-snow vehicle types and train personnel to operate in these regions."²⁰

Lemming also highlighted that the wartime exercises in the Canadian North had been devoted to the mastery of *winter warfare* and only peripherally addressed the notion of *northern* operations. Furthermore, the exercises had not exposed personnel to the extremes of climate typical in the far north. The report on *Lemming* suggested that training and equipping men to operate in the Arctic presented a different set of requirements from those encountered in winter

¹⁷ Lemming also served the purposes of the Department of Mines and Resources, which had expressed an interest in using over-snow vehicles to supply survey parties which they hoped to dispatch to Victoria and Banks Island during the winter of 1945-46. DHH, 314.009 (D179), *Winter Trials: Tests 1944-45* "Exercise Lemming," 1 March 1945.

¹⁸ Exercise Lemming, Lessons Learned: Winter Exercises, 1945-54, DHH 81/675.

¹⁹ *Post-War Canadian Defence Interests in United States Defence Projects in Northwest Canada*, Preliminary Draft by Army Representatives on Joint Drafting Group, Working Committee on Post-Hostilities Problems, 6 July 1945, *DCER Volume 11, 1944-45*, 1582. On "the North African analogy, see Eyre, "Custos Borealis," 157.

²⁰ Cold Weather Trials: *Exercises Ex Lemming* CAORG Report No. 25, 24 May 1945, DHH 746.083.

operations within the treeline. Key personnel had to be trained in route-finding and navigation over poorly-mapped and featureless arctic expanses (at least as they were seen through southern eyes). Special clothing, training, and life support equipment had to be provided to permit troops to cope with the arctic wind.²¹ As a result, the Army concluded that none of the exercises could be considered “a final test of efficiency of the fighting man under arctic and sub-arctic conditions.”²²

Planning for *Musk Ox* started immediately after *Lemming* concluded. In a private railroad car heading south from Churchill, Lieutenant Colonel Patrick Baird (who had commanded the exercise in the field), Colonel J. Tuzo Wilson (the director of Operational Research with the Canadian Army Operational Research Group), and Walter Wood (the assistant American military attaché in Ottawa) were impressed that oversnow vehicles had covered 600 miles (966 km), and they now contemplated a more difficult feat: “why not try a 3000-mile northern sweep with a fleet of the best of them?” Such an expedition would provide a critical test for both men and equipment, with aerial resupply by the RCAF providing an opportunity to test military aircraft in northern conditions. With this idea top of mind, Wilson spent the next few months convincing his superiors of the need for an additional northern exercise and quickly won over Brigadier S.F. Clarke, head of Research at National Defence. Clarke believed that the Canadian Army should be able to operate anywhere in the country, including in Arctic conditions, and thus lent his support to the bold initiative.²³

In historical context, *Musk Ox* is best considered the culmination of the winter exercises that the Canadian Army carried out during the war. “At the end of the war it was clear that much of the information so gained could be used in the development of the Canadian northern territories and that some of the equipment could be adapted to civilian needs,” Lieutenant Colonel Graham W. Rowley, commander of the exercise’s Baker Lake Force, noted:

In particular it was thought probable that the Canadian Armoured Snowmobile originally designed for a projected invasion of Norway, would be capable of winter travel in country

²¹ The M7 half track was deemed unsuitable for arctic operations. Cold Weather Trials: *Exercises Ex Lemming CAORG Report No. 25*, 24 May 1945, DHH 746.083.

²² Exercise Sweetbriar, Vol. III, Report of Canadian Army, NARA, RG 409, Entry (NM3) 429, Box 3, File Exercise Sweetbriar Vol. III.

²³ Kevin Mendel Thrasher, “Exercise Musk Ox: Lost Opportunities” (unpublished M.A. thesis, Carleton University, 1998), 16-17; P.D. Baird, “Musk-Ox Retold,” Library and Archives Canada (LAC), MG 31 C9, vol.10. Published in *North/Nord* (November-December 1978).

which had previously been possible only for dog-teams; and that the transport of supplies by air, already familiar in the subarctic bush country south of the tree-line, could be extended to the barren grounds of the north by the use of war-time improvements in flying technique and navigation. The Canadian Government therefore decided that the Canadian Army, supported by the Royal Canadian Air Force, should carry out a long journey in north Canada to demonstrate that winter travel on these lines was now practicable in regions which had previously been considered inaccessible to mechanical transport.²⁴

Exercise *Musk Ox*

When Exercise *Musk Ox* took place in the winter of 1946, its primary goals were modest. As Patrick Baird explained to the press, “the Canadian Army realizes that its knowledge of our North country is still limited and this exercise has been designed to discover how troops can live under Arctic conditions, maintain their mobility and communications, and how air supply techniques, well-proven in other latitudes, will stand up in the barren grounds.”²⁵ The proposed plan to move a mechanized force over 3,000 miles (over 4800 km) across northern Canada, relying primarily on air resupply, captivated the Canadian and international defence communities, however, and soon came under “the full glare of national and international press coverage.”²⁶ As John Lauder effectively recounts, the media tied *Musk Ox* to the threat of an aerial or ground attack from the continent’s northern approaches and to worsening relations with the Soviet Union. American newspapers gave extensive coverage to *Musk Ox* and headlines such as “U.S., Canada Plot Far North Defence”; “U.S., Canada to Prepare A-Bomb Defence in Arctic”; and “U.S. and Canada

²⁴ G.W. Rowley, “Exercise Muskox,” speech delivered 28 October 1946, published in *Geographical Journal* 59 (April-June 1947): 175-85.

²⁵ Cited in G.J. Moffat, Exercise Muskox Overview, UTA, B93-0050, Box 53, File Ex Musk Ox. As the instructions given to the American observers on Musk Ox reflect, U.S. interest in the exercise went beyond science. See U.S. Army Report on Canadian Winter Exercise Musk Ox, NARA, RG 165, Entry UD-1020-B, Box 100C.

²⁶ Eyre, “Custos Borealis,” 157; Ex “Musk-Ox,” DHH, 746.033 (D2). Considerable publicity attended the completion of Musk Ox but the Canadian government made no attempt to capitalize on this national and international attention and even tended to play down the operation. The Minister of National Defence speaking in the House said, “There is nothing secret about this expedition; it is a very small one.” *Debates*, 14 December 1945, 3552-3. Despite the “non-secretive” nature of the expedition, the exercise report remained classified until November 1975.

Join to Guard Polar Area” were common. One French military writer even went so far as to claim that, “Since World War II two events have held the interest of military circles--Bimini (referring to the American nuclear tests in the Pacific) and Operation Musk Ox in the Canadian Far North.”²⁷

To counter the news media’s militaristic narrative, Patrick Baird, J. Tuzo Wilson, and Canadian politicians emphasized the scientific objectives of the exercise and its civilian benefits.²⁸ Wilson even wrote to his associate, the famous Arctic explorer Vilhjalmur Stefansson, asking if he could:

do anything to counter-act the unfortunate notion that this exercise is planned by those with anti-Russian feelings, I wish you would do so. As one of those responsible for the exercise, I feel strongly that the Russians have done far more to develop the North than we have and I hope that the demonstration provided, and the publicity, may do something to further Canadian interest in their north country. I pointed out that the southern end of the exercise at Edmonton is almost as close to Mexico as the northern part of our route is to Russia, but so far no one has accused us of trying to defend Canada from attacks by Mexicans.²⁹

The public relations campaign would meet with only limited success and media speculation about the true purpose of *Musk Ox* continued throughout the exercise.

Work-up training for the *Musk Ox* was conducted in Shilo, Manitoba and then Churchill, which would serve as the launching point for the exercise itself. Soldiers qualified as snowmobile drivers and trained in navigation, shelter building, and other arctic skills during brief patrols into the Barrens around the base. After delays owing to poor weather and mechanical troubles, the Moving Force began its long trek on 15 February 1946. Their route took them north to Eskimo Point (Arviat) and then west and north via Baker Lake and Perry River to Cambridge Bay. Here the force rested and explored for ten days before continuing on the Coppermine and thence south through Port Radium, Tulita (Fort Norman), and Fort Simpson to the Alaska Highway at Fort Nelson. From Nelson, the Moving Force intended to press south along roads to the final destination at Edmonton but the dust storms stirred upon on the highway by the

²⁷ French Army Scientific Bureau in *Revue des Troupes Coloniales* 1946 (Trans and digest in “Polar Expeditions,” *Military Review* 27/1 (April 1947).

²⁸ Eyre, “Custos Borealis,” 158.

²⁹ Colonel J.T. Wilson, Director, Operational Research, to Dr. Vilhjalmur Stefansson, 11 December 1945, University of Toronto, B93-0050, Box 50, File 01, Correspondence.

convoy led to continuous breakdowns. In Grande Prairie, Alberta, the vehicles were loaded onto a special train with five flat cars and carried to the provincial capital. There, after 81 days on the trail, the Musk Oxers received their final mission order to stand down, just one day behind schedule (6 May 1946).³⁰

“The public and military reaction to *Musk Ox* blew the solid research accomplishments of the exercise beyond reasonable proportions,” Eyre observed. “Commentators in Canada and abroad persisted in ignoring the often repeated Canadian government claims that *Musk Ox* was a small non-tactical exercise designed to work out several technical problems related to military operations in the winter and to support certain limited scientific experiments.”³¹ From its onset, the exercise revealed the low tooth-to-tail ratio of northern operations, with a great disparity in size between the small group that made the voyage (a moving force that ranged between 40 and 50 people, including civilian scientists and foreign observers) and the large support elements that made it possible. The Royal Canadian Air Force (RCAF) formed a special squadron to re-supply the exercise (generally No. 1 Air Supply Unit required over 200 men for flight operations), and more than two hundred soldiers “man[ned] a base camp exclusively dedicated to providing support for a platoon-sized force operating in a non-tactical setting.”³²

The exercise showed that, with existing technology, a joint army-air force effort “could supply and maintain a small ground force over the entire expanse of the Canadian Arctic,” historian Kevin Thrasher concludes. The British military observer, Andrew Croft, concluded that:

Small columns could operate in the arctic provided they were properly trained, properly equipped, and properly maintained. Conditions of operation have much in common with those in deserts. Only small forces can be maintained and small effective mobile forces can by careful attention to their routes move almost

³⁰ Kevin Mendel Thrasher, “Exercise Musk Ox: Lost Opportunities” (unpublished M.A. thesis, Carleton University, 1998). On Musk Ox, see Lieut. Colonel G.W. Rowley, “Exercise Muskox,” *Geographical Journal* 109/4-6 (October 1947): 175-185; J.T. Wilson, “Exercise Musk-Ox, 1946,” *Polar Record* 5/33 (December 1947): 14-27; Patrick Baird, “Musk Ox Retold,” *North* 25/5 (September/October 1978): 24-44; and Halliday, “Exercise ‘Musk Ox.’”

³¹ Eyre, “Custos Borealis,” 160.

³² Eyre, “Custos Borealis,” 158.

anywhere, except during the thaw, and will have larger less mobile, and less suitable forces at a very great disadvantage.³³

Post-exercise reports concluded that better training and equipment were required before any kind of proficiency could be obtained in arctic operations.

Tracks North

In *Tracks North*, Lauder guides the reader through the Musk Oxers' journey. In Chapters 1 and 2, he lays out the reasons and objectives for *Musk Ox*, the planning challenges, media speculation about the exercise, the personnel and equipment utilized, the establishment of the support bases, and the initial training carried out at Camp Shilo. Chapter 3 deals with the selection of leaders, increasing domestic and international interest, advanced training in and around Churchill, and the preparations of the RCAF. In Chapter 4, he describes the efforts of the Baker Lake Force, whose week-long journey turned into a 25-day trial of endurance, while Chapter 5 narrates the experience of base life at Churchill. In Chapters 6-11, Lauder recounts the story of the Moving Force, relaying each leg of the journey from its departure from Churchill to its arrival by train in Edmonton, and the efforts of the RCAF to keep the group supplied. Chapter 12 concludes with a description of the lessons learned from the exercise – lessons that he argues were ignored and all but forgotten.

In the book, Lauder's stated objective was to explore the "human interest side of the story" with little stress on the scientific or military aspects of the exercise.³⁴ In so doing, he identifies many of the key themes that define *Musk Ox*. He effectively captures the international interest that brought ten foreign military attachés to Churchill (including one from the Soviet Union) and sparked the imagination of the press. He underlines the drama of the expedition as it sought to transit largely unmapped areas, sometimes unknown to non-Indigenous Canadians, in harsh and unforgiving environmental conditions. He also highlights interactions of exercise personnel with Indigenous Peoples, especially when the Moving Force and Baker Lake Force required Inuit guides to complete the journey between Arviat and Baker Lake, and then during the long haul to Perry River. The author also showcases the camaraderie between the Musk Oxers, which saw colonels washing the dishes of privates, and the solid on-the-ground leadership that made the exercise a success. Lauder's

³³ Military Operational Research Unit Report No. 35, Report by the British Army Observer on Exercise 'Musk-Ox,' UK National Archives (NA), Kew, AIR 20/7308.

³⁴ John Lauder to J. Tuzo Wilson, 21 October 1987, B-93-0050, Box 52, File 1986, Arctic Projects, UTA.

description explains why one of the participants told Patrick Baird after the exercise that: “I’ve never been so cold, never so hot, so dusty, so tired, so anxious to get home, but, boy, I’d go on another Musk-Ox any time.”³⁵

Lauder’s account also emphasizes the importance of planning and organization to successful arctic operations. Lauder points out that many of the mistakes made during the planning stage had to be rectified while training for and then executing the exercise. For instance, initial plans called for six C-47 Dakota aircraft to supply the Moving Force, but only 20% of the mechanics that the RCAF was able to scrounge together were familiar with Dakotas. Likewise, plans for Churchill Base, which contained upwards of fifty vehicles, only called for one mechanic. During the Army’s training at Shilo, the actual armoured snowmobiles that the exercise participants would use were unavailable, so they trained on Bren Gun Carriers instead. Lauder, who was stationed at Churchill Base, pays particular attention to the problems created by poor planning and preparation at that location, including unsafe conditions and protocols that led to numerous fires and challenges with the airfield.

Other issues stemmed from planners having little to no experience working in a northern environment. The RCAF provided barely any formal pre-exercise training, expecting its personnel to learn on the job – and ignoring that this was the first time the majority had worked in northern conditions.³⁶ No one thought about the impact that frozen feces from a surge of additional personnel would have on the chemical toilets at Churchill Base. No one considered how to keep the Army airborne dropping crews warm when riding in the back end of a C-47 Dakota. Too little consideration was given to how to properly heat up aircraft at Churchill, and acquiring only three serviceable Herman Nelson heaters allowed crews to preheat only one aircraft at a time. Radios in the aircraft, parked outside in sub-zero temperatures, began to develop problems and thus had to be removed and stored indoors when not in use. Lauder emphasizes that as the Moving Force traveled, the Army increased its supply demands by 25% and then 50%, forcing the RCAF to adjust and change its plans. Little consideration was given to how to evacuate casualties from the Moving Force, or of the problems that might arise from traveling in the turning

³⁵ P.D. Baird, “Musk-Ox Retold: Part 2,” LAC, MG 31 C9, vol.10. Published in *North/Nord* (November- December 1978).

³⁶ On previous RCAF experiences in the subarctic, see Edward Wood, *Per Ardua ad Arcticum: The Royal Canadian Air Force in the Arctic and Sub-Arctic*, ed. P. Whitney Lackenbauer (Antigonish: Mulroney Institute on Government, Arctic Operational History Series, vol. 2, 2017).

seasons. These are just a few of the many planning oversights and mistakes identified by Lauder.

Shortly before the Moving Force began its journey, Lt. Colonel Baird noted that “the bugs are there a plenty and I hope we can iron them out in time.”³⁷ Everyone involved in the exercise had to improvise to endure the various “bugs” encountered throughout – another major theme in Lauder’s narrative. Steaming-out equipment had to be brought to Churchill Base to solve the problem of frozen feces in the chemical toilets. The Baker Lake Force quickly determined that its rations had been prepared incorrectly, and learnt to cut up meat and frozen beans into smaller pieces to make them easier to heat. The Moving Force members had to think up mechanical and equipment solutions on the fly. When the Fort Nelson River proved difficult to traverse, the Musk Oxers created a raft. Improvisation, innovation and adaptation emerge as key traits of an effective northern operational culture.

In his attempt to tell the “human interest side” of *Musk Ox*, Lauder reminds the reader of the important roles that many of the key participants in the exercise played in the exploration, mapping, and development of Canada’s North, both before and after the exercise. While planning *Musk Ox*, Tuzo Wilson was laying the groundwork for the Arctic Institute of North America. Both Baird and Rowley, the two field commanders for the exercise, had been members of the British Canadian Arctic Expedition (1936-1939) – noted for being the last exploratory expedition in the Arctic to use traditional means of transport in the Canadian Arctic (dog sled, small boat and foot), in sharp contrast to the mechanized modes of transport used in *Musk Ox*.³⁸ Baird would go on to head the Arctic Section of the Canadian Defence Research Board and serve as Director of the Arctic Institute of North America, while Rowley had a long career supporting scientific studies with the Department of Indian Affairs and Northern Development.³⁹

Given Lauder’s role in the exercise, he also demonstrates a keen interest the activities of meteorologists. The delight and excitement that he and his colleagues at Churchill Base experienced when they discovered formerly top-secret historical weather maps (“analogues”), used in the planning of D-Day and

³⁷ Pat Baird to J.T. Wilson, University of Toronto, 4 January 1946, B93-0050, Box 50, File 02, Correspondence Musk Ox.

³⁸ John Bennett, “Rowley, Graham,” in the *Encyclopedia of the Arctic*, ed. Mark Nuttall (New York: Routledge, 2004), 1778-1779.

³⁹ Graham and Diana Rowley, “John Tuzo Wilson,” *Arctic* 47/1 (March 1994): 104-105; Sverre Orvig, “Patrick Douglas Baird,” *Arctic* 37/2 (1984): 193-194; and John MacDonald, “Graham Westbrook Rowley,” *Arctic* 57/2 (June 2004): 223-224.

left by the Americans,⁴⁰ provides one of the most “human” moments in the book. Given that they were working in an area where basic weather information was almost entirely lacking, Lauder clearly takes pride in the contributions that the meteorologists made to the success of the exercise.

Exercise Musk Ox was followed by a flurry of army exercises in the Canadian North in the ensuing decade, as well as intensifying interest in and awareness of the region as a military frontier. Several participants in the exercise, notably Graham Rowley and J. Tuzo Wilson, also touted that *Musk Ox* achieved a far broader goal. “It showed that modern methods could open the Arctic to operate a modern economy,” Wilson concluded, “and this opening of Arctic ground travel was achieved by Canadians with Canadian equipment.”⁴¹ In his opinion, *Musk Ox* marked the start of a new and modern era in the Arctic. Lauder would have agreed with his counterpart, citing future mega-projects like the Distant Early Warning (DEW) line as strong evidence, although large-scale commercial activity in most of the Arctic areas traversed by the Musk Oxers remains an unfulfilled dream even in the early twenty-first century.

Editors’ Note

The name of the exercise is written as “Musk Ox,” “Musk-Ox,” and “Muskox” in different official sources. Lauder chose to use “Muskox” in his draft manuscript so we have retained it in the volume.

We have silently corrected minor typographical and grammatical errors in the text, but we have avoided making stylistic changes to preserve the integrity of Lauder’s voice. In cases where we have added material to the text, we have either placed that content in square brackets or placed it in a footnote.

⁴⁰ See page 12 of *Tracks North*.

⁴¹ “Exercise Musk Ox and Its Trial Forerunners,” UTA, B93-0050, Box 52, File 1989, Progress Report.

Facts and Figures⁴²

Moving Force Personnel

10 Canadian Army Officers
1 RCAF Attached Officer
25 Canadian Army Other Ranks
1 Canadian Army Observer
1 Canadian Naval Observer
3 Canadian Civilian Observers
1 British Army Observer
3 U.S. Army Observers
1 U.S. Naval Observers
1 U.S. Civilian Observer

Total = 47 officers and other ranks⁴³

Vehicles

1 U.S. N29C Weasel towing a M29 Sledge (gross weight with load was about 1800 pounds. The Weasel was ordered back to base on 17 February when its sprockets began to go out of shape from the constant banging.

11 Modified Canadian Armoured Snowmobiles (4.5-ton), also called Penguins, each towing one M29 sledge and one Canadian Sledge (gross weight with load about 1000 pounds). The principle modification made to the Penguin was cutting off the top armour and putting on a light aluminum and plywood cab. Given that the exercise was not approved until late 1945, no time was available to get the equipment ready and the snowmobiles badly needed overhauls even as the exercise started. The number of participating snowmobiles was reduced to 10 after the Moving Force left Baker Lake.

⁴² Information taken from Military Operational Research Unit Report No. 35, *Report by the British Army Observer on Exercise 'Musk-Ox'*, NA, AIR 20/7308; Canadian Army Report *Winter Exercise Musk Ox 1946*, DHH 746.033 (D2); and U.S. Army *Report on Canadian Winter Exercise Musk Ox*, NARA, RG 165, Entry UD-1020-B, Box 100C.

⁴³ This number would fluctuate between 40 and 50 over the course of the exercise, due to unforeseen mechanical issues and other unexpected requirements.

Air Support

RCAF⁴⁴

- 6 C-47 Dakotas
- 3 C-64 Norseman (on skis)

USAAF

- 5 C-47 Dakotas
- 1 C-46 Commando
- 5 CG-4A Hadrian Gliders
- 1 CG-15 Hadrian Glider
- 1 PG-2 Hadrian Powered Glider

Aerodromes

Column Position	Aerodromes
Churchill to Perry River	Main – Churchill Auxiliary – Yellowknife
Cambridge Bay to Denmark Bay and return	Main – Yellowknife (as air support assets moved from Churchill to Norman Wells)
Cambridge Bay to Fort Simpson	Main – Norman Wells Auxiliary – Yellowknife
Fort Simpson to Fort Nelson	Yellowknife, Fort Nelson and Edmonton

Dakotas landed on the ice using wheeled undercarriages at Baker lake, Cambridge Bay and Port Radium. One Norseman was always kept within “hopping” distance of the exercise.

Baker Lake Force

Two D-6 tractors and two Modified Canadian Armoured Snowmobiles.

⁴⁴ Over the course of the exercise, air support was occasionally supplemented by additional aircraft.

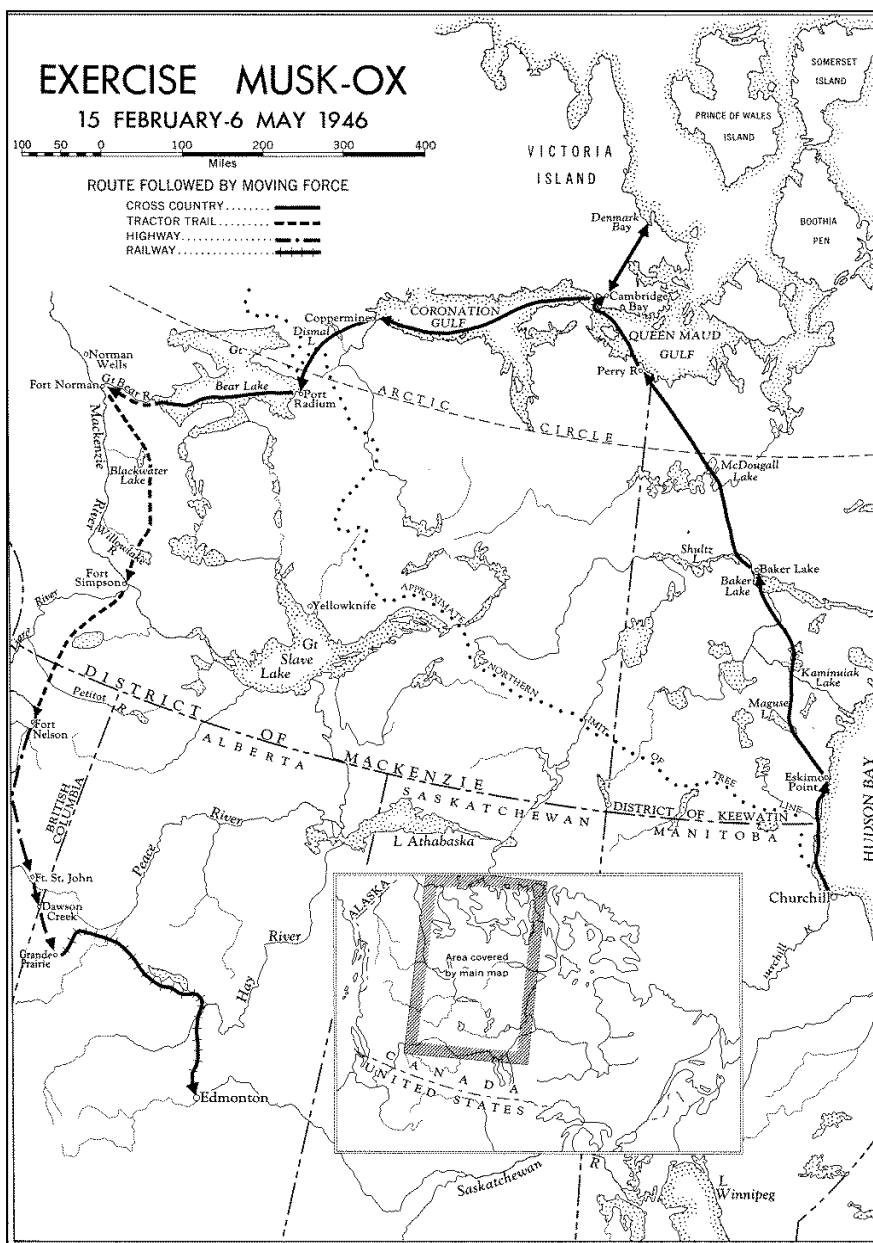
Proposed and Actual Schedule and Distance Travelled (distances in miles)

Location	Map Distance Leg (L) and Map Distance Total (T)	Proposed Schedule (by day and date)	Actual Schedule (by date)	Speedometer Readings Leg (L) and Speedometer Readings Total (T)
Churchill		Leave D (14 Feb)	Left 15 Feb	
Eskimo Point (Arviat)	L = 210 T = 210	Arrive D+4 (18 Feb) Leave D+6 (20 Feb)	Arrived 20 Feb Left 22 Feb	L = 206 T = 206
Baker Lake	L = 280 T = 490	Arrive D+11 (25 Feb) Leave D+14 (28 Feb)	Arrived 1 Mar Left 6 Mar	L = 265 T = 471
Perry River	L = 280 T = 770	Arrive D+19 (5 Mar) Leave D+21 (7 Mar)	Arrived 13 Mar Left 14 Mar	L = 372 T = 843
Cambridge Bay	L = 160 T = 930	Arrive D+24 (10 Mar) Leave D+26 (12 Mar)	Arrived 15 Mar Left 18 Mar	L = 137 T = 980
Denmark Bay (F Echelon only)	L = 110 T = 1040	Arrive D+28 (14 Mar) Leave D+30 (16 Mar)	Arrived 19 Mar Left 21 Mar	L = 123 T = 1103
Cambridge Bay	L = 110 T = 1150	Arrive D+32 (18 Mar) Leave D+34 (20 Mar)	Arrived 22 Mar Left 23 Mar	L = 117 T = 1220

Coppermine (Kuglultuk)	L = 310 T = 1460	Arrive D+39 (25 Mar) Leave D+43 (29 Mar)	Arrived 27 Mar Left 31 Mar	L = 306 T = 1526
Port Radium	L = 150 T = 1610	Arrive D+46 (1 Apr) Leave D+48 (3 Apr)	Arrived 5 Apr Left 8 Apr	L = 178 T = 1704
Fort Norman (Tulita)	L = 270 T = 1880	Arrive D+53 (8 Apr) Leave D+57 (12 Apr)	Arrived 11 Apr Left 14 Apr	L = 273 T = 1967
Fort Simpson	L = 290 T = 2170	Arrive D+62 (17 Apr) Leave D+64 (19 Apr)	Arrived 20 Apr Left 23 Apr	L = 371 T = 2338
Fort Nelson	L = 260 T = 2430	Arrive D+69 (24 Apr) Leave D+72 (27 Apr)	Arrived 29 Apr Left 1 May	L = 237 T = 2575
Grand Prairie			Arrived 4 May Left 5 May	L = 394 T = 2969
Edmonton	L = 700 (from Ft. Nelson) T = 3130	Arrive D+80 (5 May)	Arrived 6 May (D+81)	Transit by rail

List of Acronyms

ASU	Air Supply Unit
DOT	Department of Transport
F/L	Flight Lieutenant
LAC	Library and Archives Canada
LORAN	Long Range Aid to Navigation
NA	National Archives
NARA	National Archives and Records Administration
NDHQ	National Defence Headquarters
RCAF	Royal Canadian Air Force
RCN	Royal Canadian Navy
RC SIGS	Royal Canadian Corps of Signals
S/L	Squadron Leader
U.K.	United Kingdom
USAAF	United States Army Air Force
UTA	University of Toronto Archives
W/C	Wing Commander
WO	Warrant Officer
W/T	Wireless Telegraphy



Map of Exercise Musk Ox. Canadian Army map, reproduced from C.S. Beals and D.A. Shenstone, *Science, History and Hudson Bay*, vol.2 (Ottawa: Queen's Printer, 1968), 917.

Chapter 1

SEARCH FOR SOVEREIGNTY¹

“Problem: Attack from the North” read the half-inch high letters heading a map in the November 26th, 1945 issue of *TIME* magazine. The chart was centered on the North Pole, and pictured dozens of planes and missiles flying over the Arctic Islands towards target Canada. These imaginary invaders were coming from airports in the old enemy capitals of Berlin and Tokyo, and also from Chungking and Moscow, the new designated hitter adversaries.

This map, and the story which accompanied it, stemmed from a Department of National Defence press release that announced that “Operation Muskox” was the name of a military exercise to be conducted in the Arctic early in 1946. A small Army force of some 40 Canadians, plus a few selected observers from allied nations, would travel by snowmobile from Churchill, Manitoba, to Cambridge Bay and Coppermine on the Arctic shores, and then move south to Edmonton.

The trek would take 81 days, from February 14th to May 5th, and the Royal Canadian Air Force would be called upon to provide supplies to the Army force en route. The purpose of the Exercise was to study winter operations generally in the Arctic weather zone, and to assess the mobility of over-snow vehicles. An added statement that “certain technical research projects on Arctic air and ground warfare will be studied” led to press speculation as to whether the force would be selecting sites for military bases or rocket launching platforms.

The *TIME* story quoted an unnamed Cabinet Minister, who, it noted, did not mention atoms or rocket bombs. (The term then used for ballistic missiles). He stated “we all know that the invasion of North America, if and when, will come from the north, not the south. We have to be ready we have to be able to live, travel and fight in the cold.” However, when questioned further as to

¹ *Editor’s note:* Although Lauder titled his introductory chapter “Search for Sovereignty” – implying that Canadian sovereignty concerns in the North drove the planning and execution of *Musk Ox* – our research suggests that Canada did not attempt to develop the sovereignty implications of the expedition, despite its oft-expressed concern about the U.S.’s wartime military activities in Canadian North. This makes both Lauder’s chapter title, and the title of Hugh A. Halliday’s article “Exercise ‘Musk Ox’: Asserting Sovereignty ‘North of 60,’” *Canadian Military History* 7/4 (2012): 37-44, rather peculiar.

whether the force would be looking for sites from which to launch rocket bombs, he merely grinned and asked, "What do you think?"

In choosing Russia as a potential enemy, *TIME* was some four months ahead of Winston Churchill, who did not ring down his Iron Curtain until March of 1946, about the same time as the Muskox expedition reached the Arctic coast. The National Defence Headquarters (NDHQ) in Ottawa in the fall of 1945 still had under its control more than a million men in uniform. It was more involved in getting them out on civvy street than in planning to prevent a Soviet or Chinese invasion from the north.

No doubt there were hawks in Ottawa as well as in Washington and London, and there were generals who foresaw a reduction in their roles and possibly in their rank as peace replaced war. This was a chance to seriously test the vehicle designed for the invasion of Norway, but never used. It was Canadian made, the brainchild of J. Armand Bombardier, the Quebec genius, who would later get rich building a different version of over-snow machine, the Skidoo. The four-and-one-half ton tank-like carrier had an enclosed cab, was mounted on tracks three feet wide, and was identified as "Penguin" by the Army. It was some three tons heavier than the similar U.S. Army "Weasel," which had served in Europe and the Far East.

The hype about rockets and invasions was later downgraded by Army HQ, and the original terms of reference for the Exercise stated it was a "non-tactical" operation. The final report reinforced this term, as it was reiterated there many times, usually in capital letters. They apparently forgot to tell the RCAF about this, as the Air Force report contained a whole chapter on tactics. Regardless of inter-service differences, Canadians had proven overseas that they had a distinct identity and that they were citizens of a sovereign nation. Now they were out to prove it at home, by venturing into the unknown and unexplored North.²

In the early part of the 20th century Arctic and Antarctic explorers such as Cook, Peary, Amundsen, Scott and Byrd were the folk heroes of the day. Reaching a pole, north or south, was an achievement which deserved, and got, worldwide recognition. Thus Canadians who planned to use motorized vehicles

² *Editors' note:* Exercise Musk Ox traversed the homelands of Inuit, Dene, Cree and Chipewyan peoples. Further, the general area had been traveled by European explorers and fur traders. That said, parts of the route, especially the legs between Arviat and Baker Lake, and between Baker Lake and Perry River, were inadequately or incorrectly mapped. Just past Back River, for instance, the Musk Oxers encountered boulder strewn tundra where the map showed a lake. The members of the Moving Force may have been the first non-Indigenous peoples to cross some sections of the barrens west of Hudson Bay. U.S. Army Report on Canadian Winter Exercise Musk Ox, NARA, RG 165, Entry UD-1020-B, Box 100C.

to barrel “Around the Arctic in 80 Days” were bound to catch the fancy of the press, and from it, the public.

In the fall of 1945 we had not yet seen the movies nor read the books which told us of the contributions made to the war effort by the scientists, or boffins, as the British were to call them. Such developments as the perfection of radar, so useful in peacetime, and the Atomic Bomb, the more doubtful wonder, were the products of their labour. Canada had its share of these individuals, and a scientist was chosen to organize the Exercise, and named “Deputy Director of the Exercise.” By indicating that it was also to be a scientific expedition, costs could be assigned to other government departments, who would supply the necessary trained personnel. Experiments and technological studies would lower the perception that this was some kind of anti-Soviet manoeuvre.

The man chosen for the job was Colonel J. Tuzo Wilson, known to his friends as “Jock.” After graduation from the University of Toronto, he had studied at Cambridge and Princeton, and gone on to work in Canada’s North with the Geological Survey of Canada in 1938 and 1939. Although his title was “Deputy” he was nevertheless the real commander, with control of all phases of the operation. In theory he acted on behalf of the “Director” who was himself the ‘deputy’ to the Chief of the General Staff.³ This gentleman stayed at his post in Ottawa and assigned full power to his man in the field.

Wilson was to go on after Muskox to become the professor of geophysics at the University of Toronto for some 28 years, and later be Director of the Ontario Science Centre, and still later the Chancellor of York University. An expert on plate tectonics, continental drift, and glaciers, he won international acclaim in these fields. A gregarious individual, he was the ideal choice as the man to oversee the operation.

Other members of the scientific community were quick to see a chance to study the effects of the Arctic climate on their particular area of interest. So along with Dr. Wilson’s geophysics and geology came such topics as astronomy, fauna, flora, ice, meteorology, medicine, navigation, snow, topography and communications. Some scientists were to ride in the snowmobiles and planes, but most had either to assign projects to members of the expedition, or work at the bases. The costs of these studies ran from tens to hundreds of dollars. Small stuff when compared to the billions invested by the U.S.A. and Russia some 30 years later to investigate many of the same topics on behalf of their space programs.

³ *Editors’ note:* Tuzo Wilson’s immediate superior was Brigadier Samuel Findlay Clarke, head of Research at National Defence.

The Army outline plan mentioned all the items listed above under the general heading of “technical research related to Arctic warfare.” It added a few others: adapting long range air navigation systems to ground navigation, magnetic observations, and a practical one, the drawbar pull on sleds. Because of the non-tactical nature of the Exercise, no weapons were to be used or tested - except possibly for hunting fresh game.

The Army terms of reference were signed off by Lieutenant-General Charles Foulkes, Chief of the General Staff, on October 9th, 1945. These stated that the number one objective was to study Army-Air Force cooperation. One must speculate why this was necessary, as the two services had just finished fighting a war together for nearly six years.

And in spite of this choice as the top priority, the final Army report on the Exercise made no mention as to how cooperation fared. The Air Force, on the other hand, gave generous credit in its report - “interservice liaison was always excellent.” The weekly reports of the Air Support Unit to their immediate headquarters were not as glowing, and at times referred to the lack of collaboration from their brown-suited colleagues.

Although October 12th was the official date that approval of the Exercise was signed by the Minister of National Defence, the senior officers had anticipated the green light, and already had a scenario in place. Eight days earlier the Meteorological Adviser at RCAF HQ in Ottawa sent a letter to his Department of Transport boss in Toronto giving details of the plan. (Unfortunately this was never communicated to the working weathermen who took part in the Exercise, and they did not see it until after the trek was completed.) Six days after the Ministerial approval, the RCAF printed a secret organization order covering the formation of Number 1 Air Supply Unit (#1 ASU). The Unit was ordered to be in existence within two days. It was to be based at Uplands Airport and be under the control of the Air Officer Commanding, Number 9 Transport Group.

Although only 47 men were slated to ride in the snowmobiles, they required about 500 more to support them. 54% of the total personnel, or 263 troops, were from the Army, with 225 members of the RCAF, plus a few civilians. In addition to the combined land-air base at Churchill, the Air Force planned to use airfields at five other northern settlements. These would be established, used, and then phased out as the Moving Force made its way around the Arctic. The Air establishment tended to have more officer positions than did the Army. This was due to two reasons: aircrews were mainly of officer status, and there would be 13 officer rank section heads at each base.

The air plan requested that six Dakota and three Norseman aircraft be provided at all times, so there would always be a least two planes available. Two

U.S. gliders were also supplied but proved to be of limited value. In one instance a glider was landed and used as a portable repair workshop, with considerable success. A U.S. Army Flying Fortress was assigned for search and rescue duties, but its crew smartly sat out the operation in the fleshpots of Ottawa, as it was never called out.

Army vehicles to be supplied to the Churchill Base numbered 50, being made up of 17 snowmobiles, five 3-ton lorries, two 15-hundredweight trucks, 15 tracked trailers, two 10-hundredweight wheeled trailers, two U.S. Weasels, two tractors equipped with bulldozer blades, and five Ford cars, which would be used to chauffeur VIPs around the Base. The original staff list, published in October 1945, had the interesting title of "Home War Establishment," and it only called for one lone mechanic to service all these machines. Someone later realized that a 50 to 1 ratio was not good, and also that it could get cold in northern Manitoba during the winter. The number was increased to four.

The Army "Home War" personnel plan first called for a total of 161 men to fill all the jobs. By the normal process of ever-expanding government staffs this grew to 263 by January of '46. Of these, 9 would make up the Baker Lake advance party, 33 would travel with the Moving Force, leaving the other 221 to man the Base. The majority were in the General Duties category - the 'Joe jobs' as they were known. There were some more exotic trades, such as Bakers, Batmen, Clerks (Pay), Laundry and Light and Power Operators, Pioneers, Public Relations movie cameramen and writers, Plumbers and Pipe Fitters, Shoemakers, Sanitary Duties and Postal Sorters. There were two Private Firemen plus a Corporal Fire Fighter, who were destined to become the busiest men at the Camp.

The Air Force complements of manpower were similar, as each base had 13 sections. The RCAF was to operate more bases, but they had the ability to move people around, and by air. So they could manage with fewer numbers. At Churchill they only required 135 men, to fly and maintain the aircraft, and provide such auxiliary duties as airport control and maintenance, radio communications, intelligence, navigation and the supply of pay and equipment.

Setting up the personnel establishment was one thing, filling it was another. The war had just ended, King and Country had been served, and everyone wanted to go home, to wife, girlfriend and/or family. The RCAF final report lamented the situation: "Unfortunately, the personnel establishment was not filled until late January, which resulted in numerous delays in the important early organization of the Unit. Due to lack of decision on interim force policy and the discharge point systems, in many instances personnel on strength, partially trained, were posted elsewhere and replaced by inexperienced personnel, which proved to be a distinct handicap."

Regarding the men who were to maintain and service the planes, the report also noted that “considerable confusion existed at the start of the Exercise. Instances of personnel being posted in on compassionate grounds (sic) and cases where Works and Buildings electricians arrived instead of aircraft electricians.” Efforts were made to obtain men who were interested in the Exercise, but these were not successful. Of the mechanics who did eventually become available, only about 20% were familiar with the Dakota aircraft.

Did all this planning bring success? The trek was completed in 81 days, with only a slight bit of fudging when the railway was used as the means of travel for the final leg. For various reasons no movement was possible on 29 of these days, so only 52 travel days were used for the 3,279 mile (5,279 km) trip. The path was made of snow, ice, tundra, bush, corduroy road, mud, gravel, and even water. Weather conditions ranged from blizzards to dust storms, and temperatures went to extremes at both ends of the scale. Mechanical emergencies, inexperienced personnel, inaccurate maps and limited communications all offered problems. These were exacerbated by bureaucratic bungling by higher headquarters, so it is amazing that the troops completed their journey at all, let alone made it to Edmonton only one day late.

Along the way they classified snow and measured ice strength, searched for the North Magnetic Pole, established the height of land in unexplored areas, and introduced over-snow vehicles to the natives. They observed 37 kinds of birds and 23 various animals, but the ground party never did see a real live muskox. A Norseman pilot made up this deficiency, as he saw a herd of five “*ovibos moschatus*” on February 25th, when flying between Schultz Lake and the Back River in the eastern Arctic.

Air supply on such a large scale had never been tried before in Canada, so the success of this part of the operation was gratifying. The C47, nicknamed Dakota, was listed as a “heavy” aircraft in the 1940s, but is minute in size when compared to latter-day jumbo jets. To support the 40+ men of the Moving Force, the RCAF was to haul a total cargo of 838,220 pounds, or about 10 tons per man. In 61 sorties they would deliver 199,609 pounds by parachute, with less than 4% lost or damaged. The Air Supply Unit managed to keep their planes serviceable 80 to 87% of the time, and they flew a total of 2,683,123 passenger miles.⁴

⁴ *Editors’ note:* A total of 344,831 pounds was supplied by air to the Moving Force. In addition to Moving Force requirements, 51,811 pounds of supplies were flown for the Baker Lake Force. Miscellaneous sorties brought the total to roughly 400,000 pounds. This did not include the supplies freighted to forward bases from Winnipeg and Edmonton, the movement of bases by air, and extra sorties carried on by request of

The theme of the Exercise was summed up in an editorial in the *Winnipeg Tribune* on March 25, 1946. It said: "The Canadian Army's Exercise Muskox has successfully completed the first half of its difficult schedule and is now making strides toward Edmonton, terminus of the operation. Already it is apparent that the time, effort and funds expended on the experiment will pay dividends." Certainly, the Exercise did help in the development of the North in future years, but Prime Minister William Lyon Mackenzie King was not just talking to his dog when he said "Our best defence in the Arctic is the Arctic itself."

RCAF HQ, which brought the total weight of cargo carried by No. 1 Air Supply Unit to 838,220 pounds. See Canadian Army Report *Winter Exercise Musk Ox 1946*, DHH 746.033 (D2).

Chapter 2

BASICS AND BASES

One difference between the two branches of the military was in their attitude towards training. The Army planned a 10-week program, beginning with four weeks at Camp Shilo, near Brandon, Manitoba. This would take place during the last week of November, and the first three weeks of December. After Christmas they would move to Churchill, for six more weeks of advanced training, to include a series of short practice exercises on the ice of Hudson Bay. These three-day outings would serve as shakedown for the big push on February 14th. To oversee the program a Training Officer position, with the rank of Captain, was established.

The Air Force had gone full tilt into the operation in October, hoping to find enough qualified people without the need of any instructional program. They never did organize formal training, but relied on having the men learn the job while doing the tasks. In later years the RCAF was to establish a Training Command to provide all training, and the experts devised schemes to abolish courses and teach “on-the-job.”

On November 1st a Dakota carrying most of the senior people from the Air Supply Unit took off from Edmonton to visit Fort Smith, Yellowknife, Hay River and Norman Wells, returning via Fort Nelson and Fort St. John. At Norman Wells, one member of the party was impressed by the “hundreds of Canol and U.S. Army vehicles abandoned in the fields and along the river bank.” A more-philosophical viewer was to call the same sight “a junkyard monument to military stupidity,” as millions of dollars had been invested, yet the oil was never required. At Yellowknife, the survey party was appalled at the exorbitant prices in the coffee shop, where hamburgers were offered at two for a dollar.

There is a rule at military bases, still somewhat true today, that one takes the people with the least knowledge of what goes on inside and puts them on duty at the front gate to guard against spies or invaders. This was the case at Camp Shilo in 1945. Gordon McKay, the meteorologist who was to accompany the Moving Force around the Arctic, arrived at the Camp late in the evening of November 18th. As a civilian, he was viewed with suspicion but allowed entrance. No one could tell him where the Muskox group was located, so he had to wander into a likely looking building, find a bunk with a spring but no mattress or bedding, and settle down for the night. The next morning, he

located the mess hall, where the private sitting beside him remarked that the food was “as bad as that in a restaurant - in England, Sir!”

Finally, he located the Muskox offices, and was informed that training would begin on November 20th. The quartermaster stores issued him the 61 items of clothing and personal gear provided to all members of the expedition, and he attended an important meeting in the Officers’ Mess to determine what kind of party would be held on the Friday night. Training began with a five-mile route march, followed by a lecture on driving and maintenance of snowmobiles. The only flaw was that the machines at Shilo, being Bren Gun Carriers, were of a different type than those to be used on the Exercise. They were one-and-one-half tons heavier, and built as tanks, rather than as over-snow vehicles.

The next day the trainees were out camping overnight in tents, cooking their meals in billy cans over naphtha stoves. Training was programmed to consist of 396 one-hour periods, with films or lectures on Navigation, Map Reading, Signals, Igloo Building and Bivouacs, Rations, and Driving and Maintenance. The Friday night party in the Mess went on until 5 a.m., but this did not prevent the brass from scheduling a route march for 0900 hours on Saturday morning.

While training continued, the Base at Churchill was established. On December 14th Lieutenant Colonel Donald Cleghorn and a small advance party of administrative troops arrived at the northern Manitoba town by rail. They found a blizzard raging, with 40 mph winds and 25 below temperatures. Trying to drive from the rail station to the Camp with the visibility reduced to 15 feet, they repeatedly ran off the road. The severe storm gave an indication of future Exercise problems, as it caused the vehicles to break down.

On December 30th the Muskoxers climbed on the train at Brandon bound for Churchill, and after a two-day run, reached the end of the line at 5:15 p.m. on New Year’s Eve. The usual party was already in progress in the Mess and was to last all night. The temperature was 20 below Fahrenheit (-29 Celsius), about normal for the time of year, but chilly for some of the troops. The Army men and those accompanying them, who had winter clothing, were lucky compared to some Air Force staff who arrived by air, without winter gear. Air travel was fast, as opposed to two days on train, but it was not fun to take a three-hour ride in an unheated plane and find on landing there was no warm clothing available. The civilian meteorologists, who worked with the RCAF, arrived dressed in spats and fedora hats.

As the train chugged north-east from the Pas to Churchill, it stopped halfway at Pikwitonei to take on water. To stretch their legs, the troops all climbed off and marched up and down beside the cars. Colonel Wilson was

braver than the others and wandered far afield. Suddenly the engine was blowing smoke and gathering speed, with the Exercise Director running alongside trying to catch up. He finally identified an open entrance and leaped aboard. This incident was later to earn him the award of a "Train Door Detector," presented with great ceremony in the Officers' Mess.

The 15 snowmobiles, which were modified versions of those built for the planned invasion of Norway, arrived early in January. They were dubbed "snows" by the troops, and the press, arriving in even greater numbers, picked up the abbreviation for use in their stories. The machines had their top armour cut off and replaced by a cab made of plywood and light aluminum. Although the cab was designed to hold four men and all their gear, space was very limited, and the side-facing passenger seating arrangement was awkward. (It was later ruled to be physiologically unsound. Up-and-down pitching of the moving vehicle gave rise to nausea, while the individual always had a tendency to ride with the head turned to look forward).

Some effort had been made to prepare the vehicles for their Arctic journey, but apparently not by qualified individuals, as many "snows" had the tracks on backwards. Batteries were old, and usually dead. The engines and transmissions had been built for tanks by General Motors, but none of the drivers or mechanics had experience in their operation. The supposedly new machines had many miles on their odometers, and the Force was to find that many of the parts supplied as replacements were pirated from used machines. Before the Exercise ended, 15 engines had to be changed, using up the entire Army stock. In all of Canada, including the machines at Churchill, there was a grand total of 30 engines; so when these were gone it was game over.

After making reconnaissance flights over the Western and Eastern Arctic, the Air Force was content to stay relatively close to home for the Christmas break. Main Base was Uplands until December 21st, and after seven days off they set up shop at Gimli, Manitoba. From there loads of cargo and passengers were flown to Churchill, with some cargo going even further north, to Eskimo Point. Loads were brought by other Transport Squadrons from such points as Vancouver and Ottawa and put on ASU planes to go north. There was much experimenting with landing gear - switching from wheels to skis and back again.

The RCAF was actually happy to move north on January 6th. The operation at Gimli had been a shemozzle, to use a term of the day. Conflicting orders from the two controlling headquarters, No. 9 Air Transport Group at Rockcliffe, and No. 2 Air Command, in Winnipeg, caused confusion. The Gimli Base believed that its only job was housekeeping, while the ASU expected every service to be supplied. There was no Flying Control, Meteorology, Radio,

nor a flare path for night operations. Everything had to be improvised, to the point where lanterns were purchased at a local store and used as the nighttime runway lights. To add to the confusion, three American aircraft arrived during the first week of January with unserviceabilities (the military term for mechanical difficulties). This depleted the meagre stock of replacement parts on hand.

The Base at Churchill had been built by the American military to guard against any sea-borne invasion, and as a refueling stop for planes flying from the West Coast to Europe. It had been a secret project, and press speculation put the cost at ten million dollars. It consisted of a veritable rabbit warren of tarpaper covered barrack blocks, placed close together, so the inmates would not have to travel to far in any direction in the cold. Heating was provided by small oil-burning stoves, with limited fuel storage, which could not burn all night without being refilled. The U.S. troops had not been careful re spillage, so the areas surrounding the stoves were swamps of oil-stained boards.

The Camp water supply was in a heated tower of the kind which graced every railway station in the days of steam. It was located one-and-one-half miles south of the airport. Water was hauled to the Base in an ancient tank truck, prone to frequent breakdowns. Each barrack hut had its own reservoir to be filled, but due to frequent supply interruptions water was often scarce. Baths were a luxury, and when some of the more enterprising men did attempt to melt snow for ablutions, they were dismayed at the amount of white stuff needed to provide even a small pail full.

The treacherous condition of the stoves, combined with the oil-soaked floors, threatened a fire hazard that was later to become all too real. On the firefighting front there was a lack of training as well. On January 5th a fire broke out in the Officers' Mess, and an innocent bystander rushed in waving a foam extinguisher, but only managed to drench the two officers fighting the fire. At the same time, he sprayed a layer of foam over all the hats and parkas in the cloak room. Needless to say, he was not voted as a winner of any popularity contest. Col. Cleghorn, the Camp Commandant, took to setting off smoke pots in various places, to test the men's reaction. The men soon twigged to this ploy and turned out with cameras hoping to catch him in the act.

The U.S. Forces had decided at war's end to take only their troops home and left much more than ramshackle buildings behind. Furniture, vehicles, tools, equipment, scientific instruments and many technical publications remained, still packed in their original shipping boxes. There were sets of geographical and nautical maps, and, to the delight of the Canadian weathermen, several sets of historical weather maps.

These “analogues” as they were called, had been prepared by American and British meteorologists, using records dating from the early days of weather reporting. Used in the planning for D-Day, they were kept secret, so no Canadian working weatherman had ever seen them. By identifying the current situation, and finding a similar chart in the book, one could issue a forecast based on what developed in the following historical charts. Computers were later to replace the analogues as the forecasting tool, but in the mid-1940s they were a great new gimmick, true state of the art.

One of the more interesting military terms coined during the war was “FIK.” Thought to have originated with the Indian Army, the first letter stood for the adjectival form of the term all kindergarten children know as the F-word. The second letter was the cockney derivation of “high,” and the third stood for the German word for Command. Very senior officers, such as Air Vice Marshalls and Generals, had more direct dealings with National Defence Headquarters, so they used the term frequently in referring to Ottawa. But lower echelons also used the term, whenever they felt the blame should be passed upstairs.

The Commanding Officer of No. 1 ASU was Wing Commander (W/C) John “Jack” Showler, a pragmatic individual, slight of build, but strong of will. He had been a bush pilot before World War II, as had his second in command, Squadron Leader (S/L) Joe Coombes. They had been selected because of their northern experience, as had the four senior Army commanders. W/C Showler was to submit 17 weekly reports during the course of the Exercise, giving progress reports. He often included urgent requests for supplies and services, and usually only got action when the requests were so compelling that they had to be passed up to the FIK.

Showler was to remain in the Air Force for another 15 years, and, in 1957, he was awarded the McKee Trophy for his role in the aerial mapping of Canada’s Arctic regions. This put him in the same ball park as bush pilots “Punch” Dickens and “Wop” May, who shared his love of the North. Later he was named a member of the Canadian Aviation Hall of Fame for his contributions to aviation. When he died in the summer of 1989, his obituary stated: “he was a fine and decent man.” Everyone who worked with him on the Exercise would agree with such an appraisal.

Churchill airport was run by the Department of Transport. Staff consisted of a Manager (recently released pilot from the RCAF), four Radio Range operators, and four Meteorological Observers. Except for the Manager, all worked shifts to keep the field open 24 hours a day. Power was supplied by a gas driven generator, in such poor condition that the RCAF had to provide a fitter to sit and continuously watch the machine, day and night. This tedious duty

was eventually abolished, as a power line was run from the Camp to the airport building.

The Radio Range operators had facilities to talk to incoming or outgoing aircraft, but they had no experience in flying control. Thus, a duty pilot had to be assigned to do the talking whenever a plane arrived or departed. Flare pots used to mark the edges of the landing strip at night did not hold enough fuel to last through the long Arctic night, and would blow out in any winds over 8 mph. There should have been 22 obstruction lights at various points around the field, but only three were working. The standard item for marking runways at southern British Commonwealth Air Training Plan bases was rows of small Christmas trees. Trees do not grow in the barren lands, so none could be used here. So, either by day or night, the one and only runway was hard to identify from the air.

Weather during the second week of January was normal for northern Manitoba, with temperatures ranging down to -36° Fahrenheit (-38° Celsius) on the 7th, and up to +5°F (-15°C) on the 10th. Then back down to 30 below zero on the Fahrenheit scales by the end of the week. High winds caused blowing snow, which cut visibility to half a mile, preventing any flying. The meteorological abbreviation for blowing snow is BS, a term which was to become a part of the Exercise vocabulary, thanks to Bill Thurber, Officer-in-Charge of the Weather Office.

On the rare occasions when flying was possible, practice drops were carried out, and two loads dropped at Eskimo Point. A long-range flight was made to Chesterfield Inlet, which pleased the Navigators, who felt they needed practice. Radios in the aircraft, parked outside in sub-zero temperatures, began to develop problems, so they had to be removed and stored indoors when not in use. Keeping them, and the mechanics, decently warm was a problem. The steam plant that had been designed to heat the hanger refused to work and seemed impervious to repair. Herman Nelson heaters, built for the limited purpose of warming an aircraft engine prior to take-off, had to be used to provide a comfortable environment.

Chapter 3

LEADERS, VIPS AND OTHERS

The two individuals chosen to lead the Advance and Main Forces north had been selected by Deputy Director Col. J. Tuzo Wilson. Considerable light blue nepotism was involved, as both men, like Wilson, had backgrounds at Cambridge University. It resembled a John Le Carre spy story, where all the fellows go on to the same outfit after graduation. Lt. Col. Graham W. Rowley, a native of London, England and a colleague of Wilson at the DND Directorate of Operational Research in Ottawa, was to lead the Baker Lake Party. Lt. Col. Patrick D. Baird, British born geologist, a resident of Montreal, would oversee the Moving Force.

Baird was a man of extensive Arctic experience. After Cambridge he had first worked in Africa, but had forsaken the heat for the cold, and moved to the far north to work from 1936 to 1939.⁵ When war broke out, he was aboard the Hudson's Bay Company ship "Nascopie," and had immediately made his way south to join the Army.

While serving with the Canadian Forces in the U.K., he had been one of the planners for the anticipated invasion of Norway. This had made him an expert on the Bombardier "Penguin," and its capabilities. He had all the best characteristics of the early polar explorers, such as the two who raced to the pole in the first decade of the 20th century. Like the winner, Dr. Fredrick Cook, he believed in adapting to the Arctic, not fighting it, and using the Eskimo methods as necessary.⁶ But he was a military man, as was U.S. Admiral Robert Peary, and he knew there were benefits to be derived from organization.

⁵ *Editors' note:* Both Patrick Baird and Graham Rowley participated in Tom Manning's British Canadian Arctic Expedition (1936-1939), which surveyed the largely unexplored and uncharted east coast of Foxe Basin. Rowley, who had studied natural sciences and archaeology, also unearthed conclusive archaeological evidence of the Dorset culture near Igloodik.

⁶ *Editors' note:* The battle between Peary and Cook over who reached the Pole first ignited a controversy that is still waged by historians, although there is a growing consensus that both men may have been frauds. See, for instance, Dennis Rawlings, *Peary at the North Pole: Fact or Fiction* (Washington: Robert B Luce Inc., 1973); Bruce Henderson, *True North: Peary, Cook, and the Race to the Pole* (New York: W.W. Norton & Company, 2005); Nancy Fogelson, *Arctic Exploration and International Relations, 1900-1932* (Fairbanks: University of Alaska Press, 1992); and Robert Bryce, *Cook and Peary: The Polar Controversy, Resolved* (Mechanicsburg: Stackpole Books, 1997).

Baird stood 6 feet 7 inches tall, from the peak of his parka to the soles of his mukluk boots and was every inch a leader. He was an imposing figure standing waist high in the open hatch of Snowmobile No. 1, to take a salute or reconnoitre the wilderness. He wrote a number of articles for scientific journals at the conclusion of Muskox and went on to teach at McGill University.

Perhaps the best man to pass judgment on Baird's ability was Col. Norman Edwards, the senior U.S. Army observer, who made the trek in Snowmobile 2, and had close contact with the 'boss-man' at all times. Edwards was to state: "Leadership throughout the Exercise was superb ... (Baird) had the complete confidence, respect, and admiration of every individual on the Exercise at all times."

Baker Lake is located roughly midway between Churchill and Cambridge Bay, so it was planned to establish an air strip and weather station there to help the Exercise. It would be used as a refueling stop, and so reduce the length of supply flights to the Moving Force when it got north of the Arctic Circle. The plan called for a party of eleven men, in two snowmobiles and two caterpillar tractors, hauling cargo sleds, to leave Churchill on January 7th. The base would then be in operation in late January. Due to a series of delays, the party did not leave until the 24th, a date when it had been expected its journey would end. The official reason given for the delay was that the winches to pull the loads had not arrived. However, all the "snows" were in such poor shape that major overhauls were heeded before even two good ones could be found.

Baker Lake Force leader Graham Rowley had read archaeology at Cambridge, but his studies of ancient times did not prevent him from living in the present. He was fully aware of the hazards of Arctic travel, and his colleagues considered him to be a "gung-ho" Brit. While on the trail he demonstrated leadership by wading into water lying on the ice, even though the temperature was 27 below. This was done to extricate a sinking snowmobile, and wet feet would undoubtedly lead to frostbite. He also maintained the morale of the 10-man party on their 25-day journey, moving in untenable conditions.

Lt. Col. Rowley was to work with the Defense Research Board for some five years, and then was appointed as the Secretary of a high-level committee which reported to the Cabinet on matters of northern development. Later he became the Scientific Adviser to the Department of Indian Affairs and Northern Development. On retirement from government service he joined the staff of Carleton University as a Research Professor.

Two of the more interesting characters assigned to the Exercise were Majors R.F. (Frank) Riddell and Earl F. Hersey.⁷ Riddell was to command the Signals vehicle of the Force, while Hersey was in charge of Base Signals at Churchill, and later at Edmonton. Thirteen years earlier, in 1932, they had both been part of the chase and shooting of Albert Johnson, who was to live in Canadian legend as the Mad Trapper of Rat River. Then a Staff Sergeant, Hersey was seriously wounded in the shoot-out. He was kneeling to fire, and the bullet hit him with such force that he was lifted off the ground and cartwheeled into the snow. The missile cut through his left knee, his elbow, and then ripped into his chest, causing five wounds in all.

Luckily the posse surrounded Johnson within minutes and shot him dead. Pilot “Wop” May, who had been monitoring the chase and the battle from his plane overhead, landed immediately and loaded Hersey into his aircraft. Within an hour the doctor in Aklavik was providing the medical treatment that saved the Sergeant’s life. In his youth Hersey had been an Olympic runner and was reputed to have the fastest dog-team in the Arctic. He was later to demonstrate that he also had quickness of wit.

While serving in Edmonton, the Major apparently became friendly with the wife of one of the soldiers travelling with the Moving Force. After the Exercise was completed, the man charged into the Edmonton Officer’s Mess in search of the alleged wrongdoer. The first person he encountered was Hersey, wearing civilian clothes. The NCO enquired as to where Major Hersey was to be found, not knowing he was facing his prey. One of the Meteorologists standing at the bar was fingered, and Hersey made a quick exit during the ensuing argument as to the identity of the wronged weatherman.

Flight Lieutenant (F/L) J. A. Williams, an Air Force Medical Officer, arrived in Churchill on January 6th. He learned to his dismay that the Army was not going to provide medical equipment to the base at Yellowknife, where he was to be the senior M.O. He quickly returned to Winnipeg to find and requisition the supplies. This done, he took the equipment to Gimli, and spent some time there examining the troops. Following an eight-day break in a warmer climate, he returned to Churchill, where he was to do yeoman service checking sanitary conditions. In the airmen’s huts he found chemical toilets brimming with frozen feces (spelt as “faces” in his report). Until the Army was able to find some steaming-out equipment, which took several days, the men had to run next door and use the facilities in the canteen, when the urge hit them.

⁷ *Editors’ note:* Riddell and Hersey worked on the NWT and Yukon Radio System as members of the Royal Canadian Corps of Signals during the interwar years.

The good doctor was not anti-Army as some airmen have been known to be. In fact, he was to recommend that the Army airborne dropping crews be fitted with electrically heated suits. These individuals were subjected to extreme cold for long periods of time, riding in the back end of the Dakota planes. As per normal, there was a glitch - there were no outlet plugs in that section of the plane to provide connections to the suits.

A major problem facing Lt. Col. Cleghorn, the Camp Commandant, was the uncontrolled influx of VIP visitors. Limited space and staff made it hard to accommodate these high-ranking brass hats, who usually arrived in plane loads. Senior officers did not have the time nor the inclination to take the four-day return train trip from Winnipeg to the Base and back. The RCAF grumbled that vital equipment was unloaded and left behind in Gimli to make room for the gate-crashers. Attempts were made to restrict the visits, but to no avail.

Canadian, American and British General Officers arrived, accompanied by their staffs. When two such parties of five or six came at the same time, Cleghorn and his staff were hard pressed to provide food, drink, housing, transportation and entertainment. Fortunately, the chilly weather and the primitive living quarters served to restrict the extent of the visits to one or two days in most cases. Some stayed longer, intrigued by the Arctic milieu and the free rum ration.

One such set of visitors who overloaded the accommodation and filled the bar were ten foreign military attaches from Ottawa and Washington, who came accompanied by five Canadian escorts. The envoys represented such countries as Chile, Peru, France, Belgium and Norway, as well as the U.S.A. From Russia, the recent ally and presumed future enemy, there was a Colonel, complete with his interpreter. The group was treated to a snowmobile journey of nine miles to Fort Prince of Wales, the oldest stone fort in Western Canada, built in 1733. A guard of honour was mounted to greet the visitors. The Hudson's Bay factor then fired one of the antique 24-pound cannons, using gunpowder packed into a two-inch pipe to charge the weapon.

There is no record as to whether the two French envoys in the party were given a history lesson explaining that three French warships, under the command of Jean François de Galaup, had landed a force of 400 men and captured the Fort in 1782. Not a shot was fired in this engagement, as Governor Samuel Hearne considered discretion to be the better part of valour. The cannons were spiked and the Fort blown up. Hearn returned the next year and opened a new post 8 km upriver. In 1934 the Canadian Government restored the Fort as a tourist attraction.

In early 1946 the main invading force was the press. The news gathering associations and syndicates, city newspapers, *Life*, *Time* and *Newsweek* all sent

representatives. Members of the Force were bombarded to provide photo opportunities, their biographies, and answers to the big questions – “Were they going to survive?” Well known war correspondents, without any battles to cover, came to see the new war zone. When the journalists interviewed Col. Wilson, he would reply: “Man has a natural enemy up here and the Exercises is made interesting by fighting the weather.” This enemy was demonstrating its power, with temperatures down to 35 below during early January.

The accredited observers were another group. The majority of these were American, with four from the Army, two from the Army Air Corps, two Navy, and one from the Marine Corps. The U.K. had four, and the Canadian Government Departments another four. Twelve went along as full-fledged members of the Force, filling essential jobs. The other five stayed mostly in the south and visited the Force from time to time at points along the route. Most tried to avoid the initial training at Camp Shilo. One U.S. observer who did take in this training called the Camp “Shiloh,” after the Tennessee battle site from the American Civil War.

The Moving Force had not forgotten advanced training. First came igloo building, not a simple task. Some who had thought that it would be kid stuff, like using children’s play blocks, soon learned this was not so. Time was needed to cut the blocks so they would fit together. Even when built exactly to plan, the buildings might collapse. Minor cheating was used to improve the tensile strength, such as lighting a fire inside to solidify the ceiling through melting. The final test was to take a walk over the roof without falling through, and this level of skill was eventually achieved by everyone.

Then, for something completely different, chemical warfare testing. Evaluation of gas masks at 25 below with a 15-mph wind blowing resulted in a lot of frozen cheeks, at the point where the air intake touched the face. Other types of masks were found to completely ice up in minutes, so that the wearer could no longer breathe. De-icing methods would have to be found, if the enemy had some non-freezable gas which would not blow away in the bitter Arctic wind.

Next came marches out on the Bay ice, some for overnight stays in tents or igloos. The tents were designed to sleep six men, but the added nylon liners made it difficult to accommodate four. The bulky liners took up so much space that the simple acts of dressing and cooking became problems. The igloos provided space and warmth, but cooking also steamed up their walls, so fear of collapse was always present. The troops were never sure whether sleep came easily in the igloos because they were comfortable, or because the energy spent in constructing them made one so tired that a long, deep sleep came involuntarily.

The week of the 14th to the 21st of January was a busy time in the air, with practice drops day and night, and supplies delivered to Eskimo Point, 210 miles north. For W/C Jack Showler, it was a week of frustrations. The Sicard snow blower, used to clear the runway, was totally unserviceable. Only three Herman Nelson heaters could be made to work, so only one aircraft at a time could be preheated to get the engines to start. Spares had to come from Montreal, where they had to be bought from dealers by local purchase order - yet another built-in bureaucratic delay.

A Norseman, while taxiing, turned into a snowbank and tore a hole in the underside of the fuselage. Plywood was used for the repair, as it was the only material available, but which apparently made it better than new. When the plane was landed on the Bay ice during a practice exercise the next week, the pilot stated that the performance of the repaired edition was superior to that of the original.

“Operation Kelsey” was a three-day practice exercise held from January 21st to January 23rd. On the first day clear skies and temperatures up to 20 below allowed for 20 miles of travel, despite numerous breakdowns. It was milder on the second day, but blowing snow and 25 mph winds halted operations. The troops realized that it would be easy to become lost, when the visibility was only a quarter of a mile. They were only 20 miles from Base, but communications were so poor that they were all alone with no firm method of navigating. The message became clear that their trek through the barren lands was not going to be any cake walk.

The bad weather continued on the third Exercise day, but improving conditions in the late afternoon allowed the Force to limp back to Churchill. During the second day, aircraft had gone out searching for the party, but were unable to spot the snowmobiles due to the blowing snow. To make the machines more highly visible, it was suggested that the tops be painted international orange. This was not done, lacking paint and a warm place to do the job. In spite of the sub-zero temperatures in which they had been operating, the engines overheated. Changes were made to the exhaust system, with longer pipes pointing upwards, instead of horizontally to the rear. Experience was to show that this change was of little value.

The tracked trailers were found to be difficult to pull, especially over rough ice. The decision was made to reject them and go back to the more old-fashioned sleds. Mechanical failures had been so prevalent on “Kelsey” that the troops were beginning to think that possibly their vehicles should be assigned to the junkyard. One machine had lost its transmission completely on the last day, so its crew had hitched a ride home with one of the others. The rescue vehicle

developed a loose engine head, which had to be hammered down frequently on the run home.

Lt. Col. Baird, optimist and pragmatist, had just come from fighting a war where you never revealed defects or weaknesses to your enemy or to the public. So, two days later he called a press conference to praise the snowmobiles. He told the newsmen that within ten years tourists would be taking trips to the North Pole in improved models of the vehicles. He suggested that the price would be "\$1,000 a crack." Looking on the bright side of the recent practice exercise, he explained that the men had found a good use for the overheated engines. Frozen food could be quickly thawed by placing the tins on the exhaust, or by hanging the grub close to the engine.

Chapter 4

BAKER LAKE OR BUST

As mentioned earlier, the geographical location of the fur-trading settlement of Baker Lake made it an ideal place to establish an Exercise Base. To meet the operational and scientific aims of the project, a combined airfield/weather station/magnetic observatory was to be installed. The safety of the aircrews was of prime importance, but the secondary benefits were also great. The weather records and magnetic studies would not only have long term value, but they were essential for the successful conduct of the Exercise, both in the air and on the ground.

Weather reporting stations were virtually nonexistent in the Eastern Arctic. For the forecasters at Churchill, the nearest reports came from Coppermine, 1300 km north-west, Fort Smith 1,000 km west, and Chesterfield Inlet, 500 km north north-east. These observations were taken by non-professionals, Hudson's Bay employees, members of the Royal Canadian Corps of Signals, and others for whom it was a secondary job. To have a real live meteorologist at Baker Lake providing reports would be a giant step forward.

Caterpillar tractors were included in the advance party for two reasons. They would be used to clear the ice from the Lake to make the airstrip, and they were able to haul very heavy loads. One pulled a caboose mounted on a sledge, which served as sleeping quarters for the operators, and also for storage of perishable foodstuffs. As they were never shut down during overnight or emergency stops, fuel consumption was high.

Some whimsical lover of the poetry of Clement Clark Moore had given the two snowmobiles in the Party the code names "Prancer" and "Dancer." Each one was to tow a tracked trailer, loaded with drums of gasoline and frozen food, plus the important kegs of navy rum. The frozen food was Army brand, such items as pork and beans spread out in cake tins to freeze, and then cut into loaf size and stored in cotton bags. Although the main Force was to abandon the tracked trailers in favour of sleds, they neglected to tell the Baker Lake Party. The final report on the Advance Party trip indicated minimum trouble with these trailers, but did make 10 recommendations for improvement.

Four officers were involved - Lt. Col. Rowley, Commander; Lt. Col. William Gunn, Ordnance Corps, whose secondary duties included collecting wildlife specimens for the Royal Ontario Museum; F/L Bill Cooke, the RCAF engineer who would build the airstrip; and Mr. Donald Storr, Meteorologist. Two driver mechanics and a signalman made up the snowmobile crews. The

tractors were driven by civilians Eric Carlson and Gunner Ingebritson, both Churchill natives who had experience in tractor operations. Two Army tractor drivers of Corporal rank were assigned to provide assistance. Ingebritson was later to obtain his pilot's license and take part in many search and rescue missions in the Eastern Arctic, becoming a local hero. On one mission he located a RCAF crew who became lost themselves while on a search and had to land on the ice in the middle of the Bay.

Like the snowmobiles, the tractors had seen much wear and tear before being shipped to Churchill. They lacked proper towing winches, and holes had to be cut in the tracks to convert them from summer to winter use. With the constant running, the mileage per gallon was calculated to be .58 miles per gallon, slightly less than one kilometer per gallon. So although the "cats" were effective, they were expensive to operate.

After weeks of frustration, and 17 days after the planned date, the Baker Lake Force was finally ready to move. For the benefit of the press photographers a saluting platform was set up in the Camp, draped with a Union Jack. Prancer and Dancer passed in review and headed northward into the town. Here they stopped at the Hudson's Bay store to purchase cooking utensils and enamel plates. (They had been issued mess tins, but preferred plates.) Going was slow on the rough ice of the harbour, but out on the Bay a smoother track allowed them to speed up, and pass the two tractors, which had left before them.

By 5 p.m. they had gone 30 miles, and pitched camp in the dark. Blowing snow cut the visibility, and the temperature dropped to 30 below. This was pleasant compared with the conditions they would encounter during the next 26 days. They tried in vain to contact Churchill by radio, as the low temperatures apparently made the set inoperative. Using the radio drained the batteries on #722 (Prancer) so much that the next morning its engine refused to start. After six hours spent in charging batteries with a jump from the other vehicle, they were able to move at 2 p.m. Progress of nine miles got them to a trading post near the mouth of the North River by day's end, and they decided to lay over for a day and make repairs. Significantly, it was Robbie Burns Day, and one where the plans had started to gang aft a-gley.⁸

The next day was spent in reorganizing the loads, cutting up the meat and frozen beans into smaller pieces to make it easier to heat, and working on the run-down batteries. They waited for the slow-moving tractor train to catch up,

⁸ *Editors' note:* Robbie Burns Day is celebrated in parts of Canada on his birthday, 25 January. Here Lauder references one of Burns' most famous poems, *To a Mouse*, which contains the line: "The best-laid schemes o' mice an' men / Gang aft agley." Translated, this means, "The best laid schemes of mice and men / Go often askew."

and let it pass on ahead. A trapper from 100 miles inland came by with his dog team. He had seen no humans for five months, so the size of the crowd was a surprise to him. The troops were on their second day away from civilization and decided to send mail south to the Base via dog team.

The sea water along the shores of Hudson Bay yields three kinds of ice as it freezes - an ice foot permanently attached to the shore; floating sea ice farther out which moves up and down with the tide; and hinge ice in between which connects the two. Daily tidal vertical movement of eight to twelve feet makes the hinge ice very rough, at times an impenetrable barrier to travel. Once on the floating ice, conditions were generally smooth. On the 27th, the Force made its way out on to the sea ice, but learned another hard lesson. Tenting on the Bay gave rise to two problems - anchoring the tent pegs in the rock-hard ice, and a lack of insulation under the sleeping bags, when compared to a floor made of snow.

The Force achieved 30 miles on the 27th, in spite of temperatures in the 35 below range. The next day winds of 26 mph gave blowing snow and near zero visibility, so the two vehicles became separated. After searching for each other's tracks and leaving messages on the road, misunderstandings kept them apart until the afternoon of the 29th. With all the tracking and backtracking, they had only covered 25 miles in two days. The optimistic planners had thought they could make it to Baker Lake in a week, but they had now been six days on the road and were only one-quarter of the way. The next day Dancer lost its trailer, but its crew did not discover the loss until they had gone another eight miles. In spite of this dislocation, 29 miles were covered.

On the last day of the month they completed the three-mile run into Nunnulla by 9:30 a.m. and spent the rest of the day performing maintenance outdoors and drying out their sleeping bags indoors. There were four buildings in the abandoned post, so shelter was adequate. As the radio was still not working, they took some old boards from a lumber pile and spelled out a message in the snow. It read: "W/S U/S ALL OK" (wireless set unserviceable, all okay) and was acknowledged by a Norseman flying overhead.

On February 1st a new distance record of 48 miles was set. To mark this achievement, one vehicle and its trailer fell through the shell ice at the mouth of the Tha-Anne River into about eight inches of water. The other machine was able to tow its mate out. Rowley got wet feet while attaching the cable and, as it was 27 below, risked frozen limbs. Luckily, an empty trapper's cabin was nearby, so thawing operations began immediately. A high stack of caribou carcasses at the door gave promise of real meat for the evening meal. They gladly traded canned goods for this unexpected feast.

After three initial miles of slow going on the morning of February 2nd, they were on smooth ice, and into high gear. Knowing that they were near Eskimo Point, field glasses were used to locate the village. It was getting dark, but they were able to find their way with help from Eskimo special RCMP constable Tom Auchterlonie, who walked out two miles to act as guide. They had travelled 57 miles in 11 hours. This was a distance record for the entire trip.

Eskimo Point was civilization again, as the settlement consisted of a Hudson's Bay Post, Anglican and [Roman Catholic] Missions, and the RCMP Detachment, together with a few Eskimo shacks and igloos. The Force bunked in the RCMP building, enjoying the luxury of indoor living. One tractor had a broken mainspring. The break had been there for months, but rust and the bolt holding the two leaves together had hidden the defect. The Force wireless operator was still unable to contact Churchill, but the HBC system was working. Using the Company's network, a message was sent to the Base at Churchill, ordering the required parts for both tractor and radio.

Due to the problems relating to communication with the outside world, the decision was made to fire the useless signalman and hire an Eskimo guide. As Rowley kindly put it in his final report: "arranged to leave the wireless operator behind, as he was not interested in the journey and the wireless set was not working." The guide, Nigiak, had a camp half way along the route to Baker Lake, so had no trouble in finding the best path. In three days they covered 121 miles, in spite of 29 to 39 below temperatures, and low visibilities in blowing snow.

To date they had been travelling along the shores of Hudson Bay, but now they would have to go inland. The territory had never been surveyed, and any features which did appear on the maps were only dotted in, or left blank and marked as "largely unexplored." In spite of the barrenness of the landscape, they found a way to keep their direction, without using a compass. With the prevailing north-west wind, the snowdrifts all became orientated in this direction. These "sastruga" - from the Russian "za" (by) and "struga" (deep place) - are prevalent in this area. The directional help they provided was offset by the discomfort experienced when always moving into the teeth of the wind.

After another shopping spree in the Hudson's Bay store, they moved again on February 4th. Nigiak, the guide, found an excellent route along the chain of lakes which were almost bare of snow. After 32 miles they reached Maguse Lake, where they stayed overnight in a two-igloo Eskimo camp. There were 12 natives of three generations. Grandma and grandpa and the eight visitors were put in one room, sleeping on the same platform. As grandma coughed all night, the fine hospitality dulled somewhat, and there was no chance for isolation or privacy.

On the 5th they had 45 miles of easy going on Lake Maguse, and reached the north end of the Lake by evening to camp. The next day they travelled on Lake Kaminak, but not so easily, as it was covered with snow, and strong winds gave blowing snow which cut the visibility to less than half a mile. Temperatures were 34 to 38 below, but in spite of the weather their trusty guide moved them 44 miles. On the 7th they waited for the tractor train to catch up, and visited Niguik's village on the Ferguson River. Guide Niguik was replaced by Nuaja, an older but less competent individual. A Norseman landed to deliver a new wireless set, a new operator, and mail.

On the 8th the journey was resumed, but as there were few lakes, and many rocks were encountered on the path, progress was limited to 27 miles. On the 9th, the temperature, which had been up to -18°F the previous evening, dropped to -38°F, and the Force managed only 20 miles in the rocky going. This was the last forward motion they would achieve for five days. Forward motion on the 10th was minus three miles, as a blizzard struck, and the "snows" had to backtrack to join the cat train. The mercury recorded 47 below, and the visibility was zero in north-west winds of 35 mph.

Meteorologist Don Storr was to remark later that although he had been brought up in Saskatoon and spent all of his 27 years on the prairies, he had never seen such terrible conditions. The wind speed was never less than 30 mph, and the temperatures stayed in the 50 below range. When the mercury in his thermometer froze, it read -50°F, so he smartly took it inside to check. When he placed it in a pot of melting snow on the stove, the column went back up to +32°, so it was correctly calibrated. For the next seven days he could only estimate the readings, which apparently stayed near 50 below, as the mercury retreated into the bulb and remained there, solidly frozen.

Holed up in the blizzard, problems escalated. Snowdrifts on the outside of the tent served as insulation, but snow eventually piled up so much that the centre pole was leaning over at a 30 degree angle. They had to go outside and shovel until the tent righted itself. Half of the group could eat in the caboose at one time, and this was a welcome change from trying to dine in the tents. However, this practice was to cause yet another snafu. On the 13th the visibility improved, and although it was still 50 below the cat train took off. Unfortunately the troops had forgotten to restock their food boxes from the caboose supplies, so were very low in edibles. To add to the enjoyment, neither vehicle would start, despite a whole day spent in trying. Unable to make radio contact with anyone, and aware that their tracks had disappeared in the drifts, the hungry group wondered if and when any aircraft might find them.

Despite suffering from monoxide poisoning caused by their efforts on the 13th, the drivers tried again on the 14th, with partial success. Three spark plugs

had been removed for drying, but somehow were broken in the process. The spares were found to be the wrong size, so there were only enough to run one machine. The oil was drained, warmed on a stove, and when put back in the engine, allowed it to fire. It was decided to carry everyone in the good machine, so at 1 a.m. on the 15th, the show was back on the road. Don Storr, who was single at the time, and an incurable romantic, was to recall: "What a way to spend Valentine's Day!"

Driving through the night, they caught up with the cat train at 5 a.m. and found spare plugs, and then returned to get the other snowmobile. On the 16th they managed 15 miles before a broken sled and fuel line trouble forced them to camp. As they had reached the Kazan River, then knew they were only 44 miles from their destination. The new operator turned on his new wireless set and was able to contact Churchill, lifting morale to a new high.

Next morning they were up and away before 8 a.m. They crossed the River near the falls, not stopping to admire the scene, but noting that there was a lot of fog over the open water at the bottom of the falls. In the late morning, as they neared the shore of Baker lake, a Norseman dropped mail, which they stopped to read, knowing that their destination was just across the Lake. It was 6.55 p.m., and very dark, when they pulled up in front of the Hudson's Bay Post. The odometer on "Prancer" read 567 miles, the distance covered in 25 days of intermittent motion. Tired but happy they spent the night in the HBC trading post. They were doubly happy to be living indoors once more, as the 40 below temperatures were to persist for another week, and set a record -51°F on Friday the 22nd.

As the Moving Force had departed Churchill on the 15th and was now en route to Baker Lake, the party had no time for rest or celebrations. F/L Cooke laid out a landing strip on the ice, and the tractor crews scraped it clear and level. Four vehicles had made the trek, but only two, one snowmobile and one cat, had made it intact. Thus there were four operators to drive the one tractor that was serviceable, and long hours on the job were possible.

Don Storr unpacked his instruments and set them working, trying to adhere to the rules and regulations as closely as possible. He was amused to learn that to mount the ceiling projector, for measuring cloud heights at night, he was instructed to "obtain from a local lumber yard a cedar post long enough to go below the local frost line." For the 12 volt battery to power the instrument, he was expected to have it recharged each month after obtaining at least two estimates from local garages (governments in those days were better at saving taxpayers money). At 6 a.m. on the 19th the first weather report was sent out, with others following at three-hour intervals.

Working day and night with the one tractor, the airfield crew was able to build a strip 3,500 feet long by 100 feet wide in two days. Late in the afternoon of the 20th, a Dakota landed successfully. It brought the first of an influx of visitors, some for valid reasons, others merely curious. On the 22nd, Mr. Gordon Le Souer of the Dominion Observatory arrived to set up the magnetic observatory. Flights increased in number to the point where as many as five Dakotas would land in one day. The VIPs had found a new Arctic hinterland spot to visit, and the press a new setting for stories and pictures. This went on for a month, until the military contingent was pulled out, and only the scientists and signalmen remained.

Chapter 5

RUMINATIONS

Back to Churchill and the final week of January. The ASU made a number of drops at Eskimo Point, and more practice drops in the local area. A radio beacon, by which the ground force could guide aircraft to its location, was tested and found to be effective for a distance of 20 miles. The RCAF considered this acceptable, as their Navigators felt they could always come that close to any target.

A U.S. Army Air Force Dakota and crew arrived from out of the blue. Their orders were that they should become an integral part of the Unit. W/C Showler obliged and made them instant Canadians. The bonus was that the plane had a power driven conveyor to feed the load to the door, or, if reversed, to fill the hold with supplies. As usual, there was a glitch. The USAAF had apparently never hauled exceptionally heavy material, so modifications were needed to cope with the 400 pound steel gasoline drums, the main item in most drops. Extra rollers had to be installed on the corners, and a skid plate put at the doorway ejection point.

It was then found necessary to fly the plane with doors removed, which reduced the airspeed by some 10 mph. To retain warmth, a tarpaulin was hung over the door opening. In spite of these minor drawbacks the conveyor method was a success. No dropping crew was required, allowing for more freight. Power was saved, as heated suits were not needed. Loads could be ejected faster, and would be bunched closer together on the ground. Eight drums of gas could be tossed out in five and a half seconds, and a full load of 12 drums disposed of in only two passes.

A group of high ranking RCAF officers from HQ in Ottawa visited the Base, to learn what they could in a one day stay. One member of the party remained, Squadron Leader (S/L) Peter Millman, the Director of the Astronomy and Aurora program. He had been a professor of astronomy at the University of Toronto in peacetime. After Muskox he was named head of the Dominion Observatory, and later a member of the National Research Council. His studies of meteors won him international awards but he apparently lost interest in the northern lights when the Exercise ended.

To make the auroral observations the meteorologist had to go outside hourly into the sub-zero cold, armed with the Atlas of Auroral Forms. He would try to identify and classify the displays of coronas, curtains, bands of colour, and bright light that make up the phenomena. Don Storr, of the Baker Lake Force,

had to stare down fierce husky dogs in Eskimo settlements in order to go out and study the sky. Gordon McKay, with the Moving Force, spent his days in bumpy travel, followed by camping and housekeeping operation, so he was exhausted by nightfall. Yet he carried a spectroscope and was expected to measure the wave lengths of the electromagnetic radiation in the sky. When Dr. Millman was asked years later what use had been made of the reports, he replied: "None."

In spite of some rumblings in southern Canada from the Women's Christian Temperance Union, the authorities had ruled that every man participating in the Exercise would be issued with a two-ounce tot of over-proof Navy rum every day. Each evening the troops lined up in their various mess halls, tin cups in hand, to receive this liquid bonus. There were a few, who either from good sense, or a wish for good health, did not imbibe this strong liquor. The trick was to find one of these sober yet generous persons, and beg, borrow or steal his quota. Combined with a beer or two, the mixture made one forget the weather outside for most of the night.

There was resentment against the harsh living conditions, and frustration over the endless delays suffered by the Baker Lake Party. Abetted by the demon rum, these factors led to the formation, in the Officers' Mess, of the Arctic Parasitical Philosophical Society. As there were a number of academics involved, newcomers tended to believe that this was a genuine scientific organization. Director J.T. Wilson was presented with a "Train Door Detector, Mark II," with much pseudo-academic ceremony. Made from an old exhaust pipe and filled with prisms and lenses, its purpose was to "look into things."

Next came the great iceworm hoax, perpetrated by Bill Thurber. He was the OIC of the Base Weather Office, who had come to Churchill the first week in December. In the process of trying to obtain northern clothing and a flight from Gimli, he had many battles with the senior meteorological people in Ottawa, Toronto and Winnipeg. Finally, without authority, he had talked his way on to a flight going north, and arrived at the Base in southern civilian garb. Fortunately he was a school teacher by profession, as he had to spend the first month teaching the local staff how to do their jobs.

Thurber had a professorial demeanour which masked a brilliant sense of humour. He soon became known as "The Professor," and did his best to live up to this academic status. At age 44 he was older than Dr. Wilson by six years, and very mature compared to others at the Base. A group of bright young former war correspondents had just arrived to fill out the press corps when he gave his dissertation. They were part of the group who were confused as to the real purpose of the Philosophical Society.

To add to the illusion, Walter Fryers, a meteorologist with considerable artistic ability, prepared a large diagram of the iceworm. Under the heading "Icearius Articus," the various parts of the beast were labelled with scientific sounding Latin terms. So when Thurber began his discourse, using a pointer to refer to the picture, some members of the press began to take notes and make sketches of the drawing, in the belief that this was a serious study.

The Professor discussed the habitat of the animals, explaining that it was in the local area, 50 miles north-east of Eskimo Point. Then the similarity to the Loch Ness Monster and the Lake Okanagan Ogopogo was explained. His audience finally began to suspect that his facts might be dubious when he stated that the creatures only came out to play when there was heavy blowing snows. As the abbreviation for this phenomenon is BS+, even the most naive of his listeners became aware that, in this case, fiction was stranger than truth.

Then followed a detailed description of the species: (1) Three white horns, shaped like the horn of cornucopia. (2) A deep purple head of velvety texture. (3) Long sinuous lissome body enclosed in a snow white rubber-like sheath, which is iridescent. (4) The male has three prongs attached to his nether extremities - one for the purpose of propagation of the species, the other two to push up through the snow to detect conditions of BS+. (5) The female is not as large as the male, less gaudy, and not as interested in BS as the male. Another supposedly scientific fact discovered was that there was an inverse relationship between the populations of Kee Birds⁹ and Iceworms. The birds fed on the worms, so if bird numbers were high, there would be fewer worms. The blood of the iceworms was said to be pure ethyl alcohol (C₂H₅OH was the antifreeze being used in the snowmobiles).

The claim was made that the investigators had seen two iceworms, each at least four feet long, pulling an Eskimo's sled across the Bay. The team was hitched in tandem, and a heavy load of furs covered the sled. This part of the story appeared on the front page of the *Chicago Daily News*, with a cartoon showing a native waving a whip at his team to bring home the loot. The enterprising reporter had begun his story as fact, but on finding it fiction, had made a comic feature based on the Professor's tall tale.

On another occasion the Society arranged for a presentation to the Camp Commandant, imputed to have come from his wife. This was a tiny woolen form-fitting garment to protect his vital and private parts from the Arctic winter. It was ruled to be much better than any Army issue of long underwear or athletic supporters. This discourse inspired visions of hundreds of Ladies

⁹ *Author's note:* KeeBirds were legendary creatures which flew around the Arctic, crying "Kee, Kee, Kee, Kerist it's cold!"

Auxiliaries back on the home front knitting such comforts for troops posted to northern climes.

With everyone living in crowded barracks, huddled together to conserve the heat, voidance was a major problem. It became even more acute when the Moving Force was travelling and packed into tents like sardines. Then the sleeping bags became known as “fart sacks.” So a member of the Society dreamed up an instrument to measure the phartogen dioxide emitted by individuals, depending on their size, shape, and diet. Professor Thurber was involved in this study too, but this time as a straight man. He was able to demonstrate a ‘triple heliotrope,’ which destroyed the machine.

On an inglorious and unhappy note a disaster struck the Camp on the morning of February 3rd. A fire broke out in the Officers’ side of the “H” shaped building that held the officers and sergeants lounges. Two stewards, one a married RCAF Corporal and the other a 19 year old Army Gunner, died in the blaze. Also trapped were two husky dogs that slept in the same room, so the fumes must have been sudden and severe. The most probable cause was an exploding oil stove, although a six-man coroner’s jury of civilians from the town concluded that the fire stemmed from an “undetermined origin” and found “no negligence.” As usual, water and firefighting equipment was in short supply, and in the 25 below weather neither the snow plough nor the bulldozer would start.

Men took washbasins in a futile attempt to shovel snow on the flames, while others were posted with hand extinguishers on the roofs of adjoining buildings, with little effect. Finally the caterpillar tractor was fired up, and it cut down the outside walls of one side of the building. The roof collapsed, and the danger of the fire spreading to the nearby huts ended. By late morning, only a few charred remnants of paperboard and plywood remained. Many of the troops had seen death on various occasions during the six years just past, but this seemed so unnecessary. In its final report the RCAF was to state that Churchill Base should never be used for any operation until all buildings and the heating systems had been checked and approved by engineers.

The fatal fire did little to reduce the incidence of pyrotechnics. The ASU weekly report for February 13th to 19th, two weeks later, noted there had been four fires during the week, and a total of 21 to that date. All were attributed to malfunctioning of oil stoves. Along with attempts to upgrade the fire-fighting equipment, four men were put on inspection duties 24 hours a day, to check all stoves on a continuous basis. In the Control Tower building on the airfield, where there was always staff on duty, stoves were checked every half hour.

The departure date for the Moving Force was now just four days away. A group of doctors from the Harvard University Fatigue Laboratory arrived to check the physical condition of the men. Five medics from Harvard, plus three

Canadian Army Medical Officers, gave complete and thorough examinations. Various fitness tests were administered, including the then famous "Harvard Step Test," the forerunner of the hi-tech tests used by cardiologists today. Officers and men were herded into the theatre with their sleeping bags for an overnight stay, so they could be checked with empty stomachs. The head man from Harvard, Dr. Robert Kark, had tested soldiers in all parts of the world. He had just come from examining Gurkhas in the Burma theatre of war.

To give Churchill up-to-date news of world events, the two Winnipeg newspapers compiled and sent a summary each day. One item that was not included, or censored before the sheets were posted, was that over 2,000 members of the RCAF were on strike in the U.K. The war in Europe had been over for more than 10 months, but there were still many airmen sitting at bases in England, waiting to be transported home. The job action did get them promises that they would be repatriated by June, but little else. Presumably the story was kept from the airmen in the north in case they might wish to try the same tactics, in order to get home.

In the final week before the kick-off, the journalists covering the Exercise came up with a crop of good news, bad news, stories. One suggested that to keep the port of Churchill open all year, A-Bombs should be dropped into the waters of Hudson Strait and the Bay. Another called for a "super" icebreaker to keep the sea lanes open (this was still being kicked around 50 years later). The BBC representative to Canada complained that he was not allowed to go north to the 40 below weather. He claimed that the CBC was shutting him out, as they were preparing their own radio documentary (if his story was true, he was likely the only media person in North America not granted access to Muskox.)

One individual who accurately predicted the effects of Muskox on future air travel was Air Marshal Douglas Colyer, Head of the Royal Air Force delegation in Washington, D.C. He suggested that the lessons learned would be applied to civil aviation, and that flights over the polar regions would become routine. His talk of flight levels of 40 thousand feet seemed unreal, because at the time pressurized planes were still on the drawing boards.

Another foreigner living in Washington was Lester B. (Mike) Pearson, the Canadian Ambassador. In a speech to the Rotary Club in New York he stated that Canada did claim sovereignty all the way to the Pole. To emphasize the point, he told his American audience that if and when their planes should land on the Arctic Islands, they would be subject to Canadian laws. Reportedly, he said "when a stratosphere liner of the future lands somewhere south of the Pole, it will find a Canadian flag, a Canadian government station and probably a notice - they will be liable to fine or imprisonment or both if they do not extinguish their camp fires" (a fine diplomat, Pearson was not aware that trees

did not grow north of the 70th parallel of latitude). He went on to state that “Muskox is not for the purpose of digging any Maginot Line in the ice of our northern boundaries.”

The wind chill factor is an idea which can be classified as both good news and bad news. It arrived in Canada via Exercise Muskox. The writings of U.S. scientist Paul Siple, who first derived the concept, and the graphs to calculate the numbers, were left in the Churchill Weather Office. The Canadian meteorologists picked up on the idea, and issued multi-coloured maps to show areas where danger would be found. The troops liked this method of relating wind and temperature to show comfort. Eventually, the concept spread south, and became generally used.

Unfortunately, the offshoot is the so-called equivalent temperature, used by television and radio to confuse the public. The actual temperature and wind is converted to a wind chill figure, and then compared to what this temperature would be lowered to if there was no wind. It can lead to extreme and meaningless figures. On the Exercise, the factor was given in kilocalories per square meter per hour (as per Siple). Now, watts per square metre are used. A number of 600 is where conditions are comfortable for outside exercise if properly dressed. 1400 is where flesh begins to freeze, and travel and life in temporary shelters becomes disagreeable. At 2,000 outdoor travel is dangerous, and at 2300 exposed flesh will freeze in less than half a minute. In the first 45 days on the trail, the Force was only to experience 15 days when the chill factor was below 1400.

Chapter 6

THE FORCE MOVES

During the first two weeks of February, the Air Force was busy dropping supplies as far north as possible, and getting ready for the next stage of the operation. Ten loads of freight were hauled to Yellowknife, to establish the next maintenance base. There was a shortage of fuel at the airport on the north-west end of Great Slave Lake. Twice during January tractor trains had gone through the ice. No one had been drowned, but the operators were wary of trying to cross the Lake from Hay River. Somehow the RCAF contract to haul gas got lost in the shuffle, and their consignment of fuel never did reach Yellowknife on time.

Fort Smith was set up as an alternate refueling station, but this airfield was very primitive. Gas drums were stored miles away from the field, and the only tractor to move fuel was in poor shape. There were no heaters, hangers, nor vehicles to tow aircraft, so operations were difficult in the frigid conditions. On February 10th, four Dakotas were solidly frozen in at Fort Smith, when readings fell to 54 below. Luckily, other RCAF transports were able to help. Squadrons at Winnipeg carried goods to Edmonton, and from there the Edmonton formation relayed it on to Yellowknife.

The blizzard that engulfed the Baker Lake Force on Valentine's Day extended south to Churchill. On the 14th, the long awaited date for the Moving Force to take off, the wind was north-west at 26 mph and the temperature was -43°F. This gave a wind chill reading of 2400. The sky was obscured in heavy blowing snow, and the visibility only 300 yards. Movement was impossible, and departure was postponed for 24 hours.

The Force was made up of 11 snowmobiles and one U.S. Army Weasel, divided into three divisions. Each division was to remain intact, although the total force might spread out along the route. Breakdowns frequently caused separations, not only in the Force, but in each division. The 'line of battle' was changed after the party reached Baker Lake, with only two divisions of five "snows" each. Dead reckoning was the standard means of navigation, but in the early going they were able to follow the tracks of the Baker Lake Party. The path remained in evidence, despite Arctic gales and blowing snow.

It was 44 below on the morning of the 15th, but the sky cleared and the wind dropped to give a visibility of 10 miles. The decision was made to go, and a reviewing stand quickly erected. The bevy of photographers went to work as Brigadier General R.O. Morton climbed the platform to take the salute.

Press reports indicate that his speech was both inspirational and insensible. He said: "The ground you will cover is historic. Brave men have given their lives for the advancement of the race." He finished with the command: "to Post!" and the 12 vehicles lumbered away, as a salute of six thunder flashes went off, and the Base siren wailed in farewell. The first stop was in the town, where Mr. Urquart, the HBC Factor and Mayor, wished them well on behalf of the local citizens. As they crossed the railway tracks - the last they would see for 11 weeks - the ancient six-pound guns at Fort Prince of Wales gave yet another salute.

Then it was out on the ice of the Churchill River for a brief period of rough going, and on to the smoother ice of the Bay. Steady going until dark saw a distance of 44 miles covered, and they were now at the northern limit of the tree line. The men wanted to keep moving while conditions were good, but the leaders decided otherwise. Already there had been a blocked fuel line and an overheated engine, resulting in a two hour delay. Vehicle checks and pitching camp took up another eight hours, and all were in bed by midnight.

At 4 a.m. a breeze sprung up, and snow was drifting into the tents (they had not yet learned that tents must be pitched with the entrances facing downwind). Looking outside they could only see about 100 yards in falling and blowing snow. Although it had warmed up to 28 below, no travel was possible, and none was attempted. Everyone went to bed in the afternoon, trying to keep warm inside the sleeping bags by wearing all their clothes, including socks and balaclavas. Candles, stoves, and lamps burned out in short order, so the men were forever having to wake up and relight them. The insides of the tents became coated with frost, while sleeping bags iced over from the breath of their occupants.

On the 17th the sky cleared and the temperature once again plummeted into the 40 below range. By rising at 5:30 am the Force was moving by 8. Daylight travel was relatively easy, but with darkness new problems developed. Light was needed to repair vehicles with fuel line and carburetor troubles, yet the spotlights, the only headlights available, began to burn out. Soon only two of six machines had operating lights, making repair jobs awkward. Without lights it was hard to find and follow the tracks of those running ahead.

The speedy 1st division made it to Hubbard's Point by noon, where the lone wooden church of the abandoned [Roman Catholic] Mission was to remind them that man-made things still existed. To further boost their morale, a bag of mail was dropped, so they pressed on to reach Nunulla by midnight, having gone 67 miles. The 3rd division was not so lucky, and took 26 hours to make this leg of the trip, arriving in the late afternoon of the 18th. Because of snow and poor visibility, navigation was done by a man on foot, following the tracks the other divisions had made the previous evening.

Gas and food had been cached at Nunulla, and it was used. The U.S. Weasel developed sprocket and idler troubles, so was ordered back to Churchill, and had to drop out of the Exercise. Two months later a Weasel was used successfully to assist in the river crossings, and its ability as an amphibious vehicle proven, but for now it was lost. Gas consumption of the other machines was very high, and Base was asked for a 25% increase in fuel supplies. This did not do much to cheer up the Air Force, who were beginning to regret they had promised anything.

Two days of moving over the ice, and one of hiding from the storm, had taught the party a bit about living in the Arctic. Melting snow for water seemed to be an endless chore. The white stuff was so cold that the pans burned before the melting occurred. Baked beans and doughnuts froze solid, and had to be thawed in a frying pan before serving. In the bitter weather it was hard to perform the simple daily task of answering the calls of nature. One had to contend with the long parka, extending below the knees, an over-the-shoulder pair of wind proof pants, and then the long-john underwear. Anyone who attempted to find a private place outside soon gave up, and moved back inside. There a hole was dug in the floor, and balance maintained by holding on to the tent pole. Finally the snow was pushed back to cover the finished product.

Another method developed by the Baker Lake Force was to place a chamber pot near the door, take a turn using it, allow for a quick freeze, then toss the solid out the door, and let the next man take his turn. Gordon McKay, the Moving Force Meteorologist, had access to large weather balloons, called "PIBALS," for pilot balloons used to measure upper winds. He would take one into his sleeping bag and use it to overcome the number one problem, so he would not have to get up in the middle of the night to find relief.

It was soon learned that moisture exacerbates the cold. Condensation and plain sweat made clothing damp, but a unique way of drying it was found. The nozzle of the snowmobile heater could be pushed into sleeping bags, socks and mukluks until they were dry and warm. String vests were worn, to keep the moist clothing away from the skin, and they were very popular. On the other hand, the long-john type underwear was not liked by all. Some wore the flannel pyjamas night and day, finding them to be superior insulation.

Much of the troubles with the vehicles stemmed from the fact that 95% of the drivers had no experience, and the two and a half months of training had failed to show them all the possible difficulties. There were deficiencies in the machines. On rough ice they would only be driven in 1st or 2nd gear, yet at speeds below 10 mph the pitching was violent. This was fatiguing for the riders, and it shook loose all the dirt and gum in the fuel and cooling systems.

Temperature control methods were like those on automobiles, where a radiator filled with coolant was supposedly kept at a true temperature by a fan. The thermostats on some vehicles were found to be inoperative and presumably were blocking the coolant flow, so they were discarded. Regardless of remedies applied, the engines still tended to overheat, even at 40 below. Partly this was due to the heavy loads being pulled in the sleds, but whatever the cause, it was necessary to stop frequently to allow the radiators to cool.

Throwing away the thermostats and relying on airflow cooling created its own problems. The capacity of the fans was inadequate, so when there were tail winds, a positive pressure built up in the engine compartment. The joints between the engine housing and the cab were poorly sealed, so toxic fumes leaked through on the crew. All attempts to fix this problem were unsuccessful. Inaccurate temperature gauges, erratic operating conditions, and 120 degree difference in outside air temperature, all contributed to preventing any solution. Before the trek was over a total of 10 radiators out of 11 had been replaced. The only recommendation the final report could make was that a new and better cooling system had to be devised.

On the 18th south-east winds brought the temperature up to a mild -6°F, but snow and blowing snow cut the visibility to 50 yards, preventing travel. The next day the wind shifted to the north-west, temperatures dived to 40 below, but the visibility stayed in the 50 yard range. The settlement at Nunulla had three abandoned buildings, and one in use and livable. The trapper who used the place was not home, so the 1st division crews crowded into it to find shelter, and take turns using his bunk. Outside, three foot drifts piled up in front of the tents and vehicles.

Major Gordon Sangster of the Royal Canadian Electrical and Mechanical Engineers held the Ottawa position of "Director of Vehicles and Small Arms" (this gave him control of mechanical creatures great and small). Like many of his profession he was an intensely practical man, and he kept an interesting diary of the trek. His crew loved him because he pitched in and took his turn at the donkey work. Walking along the shore to find firewood to heat the commandeered cabin, he found two pieces of wood. He realized that this was not for burning, as it marked an Eskimo grave. Due to frozen ground, the natives did not bury their dead, but wrapped them in caribou skins and laid them on the ground, surrounded by logs. The mourners piled stones on the body until it was covered. Even in summer the remains stayed frozen, insulated by the skins, logs and stones.

In the burial ground one grave had a rifle on top, others had boats and toboggans. The natives believed in reincarnation, and included worldly goods with the graves. For the same reason, an Eskimo would never strike a child, in

case it might be an ancestor. The next day Sangster saw what he thought at first to be a clump of trees. Closer examination showed it to be a group of cairns shaped like caricatures of human beings. He wondered if it was a graveyard, a cache, or served some purpose, but was told that the Eskimo built this statuary for the fun of it.

With improving weather in the evening of the 19th, the Force was underway at 1:20 a.m. on the 20th. Fuel consumption was high, so they were glad to see a Dakota overhead. Six drums of gas were dropped, and one burst when the parachute failed to open. As they were still 50 miles from the next rendezvous, fuel had to be rationed. Mail and beer were included in the drop, giving morale a boost. When opened, the beer froze to slush immediately, but was a welcome change from tea and water. After running for 21 hours, less three hours out for repairs, they covered 97 miles and reached Eskimo Point by late evening.

During January and February, Exercise Muskox had been making headlines in all Canadian and many American newspapers. On the 16th of February, when it was expected to be big news, the Exercise was bumped out of the headlines. "RUSSIAN SPY RING BARED" read the four inch high letters at the tops of the front pages. The Igor Gouzenko story had broken in the press. Back in September of 1945 the Russian cipher clerk had gone to the Mounties, but the story kept secret until a Royal Commission was appointed.

The big media event rubbed off on the Arctic travelers. There was speculation that the whole expedition had been planned to save the uranium deposits in the north. Paranoid stories stated that the Exercise was to be given RCMP guards, followed by other tales that no such thing was contemplated. Mountie Headquarters in Ottawa issued categorical denials, but had trouble making them stick. Everyone knew that the north was RCMP territory, where they had established posts. Spies were obviously shadowing the Force, so the Mounties should shadow the subversives.

Thirty-two hours were spent at Eskimo Point in repairing, refueling and resting. An entire division of 16 men crowded into the RCMP Barracks to enjoy a night's sleep on the floor of a warm home. The ice of the Bay was left behind on the morning of the 22nd, when travel was resumed in 47 below weather. There were no trees to break the horizon, so a few boulders cropping up indicated that travel was now over land. Occasionally speeds of 20 mph were possible, but the average rate was less than 10 mph. After nine hours of running a distance of 64 miles was achieved.

On the morning of the 23rd, it was 48 below (-44°C) the record low temperature for the trip. Due to the cold, some drivers left the heater flaps on their engines closed, so radiators boiled and then had to be refilled. Direction

was changed to avoid a field of glacial rocks; the route lay along a series of small lakes, and in ten hours of driving 75 miles of progress was made.

Major Sangster was to call Sunday the 24th the “most miserable day to date” for good reason. Although the mercury had climbed to 37 below, 40 mph winds, gusting to 50 mph at times, resulted in a wind chill reading of 2372, another record low for the trip. This kind of chill would even affect brass monkeys, and is rare anywhere. To add to the fun, two inches of snow fell, the ceiling was obscured at zero feet, and visibility was down to three yards. Rather than risk getting lost and/or frozen outside, the troops cut snow blocks from the floors inside their tents and calked the walls.

With the tents rocking in the wind, and snow blowing right through them, the mere act of rolling out of a frosted sleeping bag and getting dressed was a problem. Frozen hands were held under armpits to thaw, and even those who wore two pairs of gloves to suit up found it necessary to warm these over the coal oil lamps. Some crews gave up trying to live in the tents, and moved into the snowmobiles. Here running the engines for heat created carbon monoxide, which in turn gave rise to health problems.

The blizzard not only caused discomfort, it blacked out all communications. For over 48 hours there was no contact with Churchill or any point. The area was one where point to point signals were poor, but this was a total blankness. Even when contact was established, interference was noted from radio stations in the southern U.S., the BBC in the U.K., and such Canadian stations as the Coast Guard in Vancouver, B.C. As they moved north, this intrusion of their assigned channels lessened, and near the Arctic Circle, eventually stopped.

When conditions improved on the 25th, several hours were needed to dig out the vehicles and sleds from the three foot drifts. Once moving, a new obstruction appeared in the form of large glacial boulders, which were difficult to circumnavigate. Cross-links were torn off tracks, and front suspensions broken. Trouble was also encountered with the dilution systems, in one case causing a fire that burned out the high tension wiring. Condensation and dirt in the reserve fuel cans gave rise to fuel stoppages, and sled runners were shattered by the stones. Limping along in a disorderly fashion, the first two divisions were able to cover 45 miles. No. 3 only managed to move four miles.

The leaders were now located on the ice of Lake Kaminuriak [Qamanirjuaq Lake], and two evening drops were scheduled. The first, at 7 p.m., went off successfully, but the second did not. Increasing winds and blowing snow obscured the markers, so oil drums and packages fell three miles off target. Darkness prevented a search that evening, and everyone was

immobilized for the next two days in drifting snow which cut the visibility to 50 yards.

When Division 3 was delayed by a radiator using water at the rate of a gallon per mile, remedying the problem caused burned out wiring. The machine was in such bad shape that consideration was given to abandoning it. However, the gung ho spirit prevailed; when two other machines took over its sled cargo, it could move slowly unencumbered. Late in the afternoon of the 26th the Force was united once more on the Lake.

Maj. Sangster and his crew set out to find the missing gas drums, and got lost themselves in blowing snow causing visibility down to 50 yards. Driving without reference points, they tried to get back to camp, but had to stop to allow the overheated engine to cool down. This was good luck, as the visibility briefly improved, and they saw the Force two miles away. They had travelled some 18 miles in a complete circle, and boomeranged back to their starting point. Had they missed the campsite, they could have gone 50 miles on the Lake surface without finding anything.

On the 27th, reveille was set for 0430 hours, in order to get an early start, and the first two divisions were away by 0800. Division 3 had been travelling all the previous night, so did not get going until 10 a.m. Almost immediately it was hit by 40 mph winds, blowing snow and near zero visibility. To follow the tracks of those ahead, it was necessary to send a man walking in front of the vehicles to find the trail. This foot slogging slowed progress to a crawl, but as weather had halted the others at noon, eventually all were together again.

By the time the Force was reunited, it was blowing so hard that tents could not be pitched, and the night was spent in the vehicles. Overnight the wind switched to the south, and tail winds blew engine fumes into the cabs, resulting in 14 cases of monoxide poisoning. There was snow, snow, everywhere, mostly inside the engines. With plugged carburetors and wet wiring engines refused to start. Snow removal had to be done, followed by thawing and drying manoeuvres.

When visibility improved in the morning they found to their surprise that only 30 yards away was an Eskimo igloo. The inhabitants came out to laugh at the plight of the southern strangers in their immobile machines. The natives spoke no English, but this did not prevent fraternization. The message was that the man of the family was rich, as he had two wives. He was also intelligent, as he sat down in the snow and drew a map of the area. On it he showed the normal Eskimo route to Baker Lake, and that which the Force should travel, with their heavy vehicles. There was a large river to cross, and he indicated the place where the ice would be safe. The instructions were followed, with good results.

At 7 p.m. on the 28th the 1st Division was off to run for 23 continuous hours and make the 100 miles to Baker Lake. The other two groups were not as swift. Division 2 crews had suffered severe doses of monoxide poisoning, but as the Medical Officer was in their group, they obtained treatment and moved on. Division 3 was very low on gas, and waited for a drop at noon on March 1st. In the late afternoon they thought they were 15 miles from their destination, but a Norseman landed beside them and told them the distance was 53 miles. At 11 p.m. a tractor train brought them more fuel, and by driving all night they arrived at 6 a.m. They were 36 hours behind 1st Division, and five days behind the original schedule.

Possibly the most frustrated man on the leg from Churchill to Baker Lake was Gordon McKay, the Meteorologist. In a job where communication was the most important factor to success, he was cut off from the outside world. The radio set used to communicate with Base was in the 1st Division, whereas his vehicle was in the 3rd or rear division. Most of the time these divisions were separated, so he never received forecasts intended for his use, nor was he able to transmit the limited number of reports he was able to prepare.

In theory, his job was to advise the Force Commander as to any anticipated weather problems, and to provide data back to the forecasters at Base. This was not possible until after the Force left Baker Lake, when his vehicle was moved up to the lead division. Meanwhile he had become an expert on pitching tents, servicing stoves and lamps, building windbreaks, and cooking. He got more than his share of these duties, as the Officer and men in his "snow" were responsible for maintenance of all vehicles, and also charged with ensuring that everyone kept logbooks to record any mechanical problems.

Later, on the run south from Cambridge Bay, weather charts were air dropped to the party, and he had a chance to prove his skill as a forecaster. By this time the Army had learned that weather could influence the day to day operations, so were willing to listen. Throughout the trek, Gordon McKay learned lessons of patience and diplomacy which would stand him in good stead in his career.¹⁰

¹⁰ *Author's note:* After holding a number of executive positions in the Meteorological Branch of the Department of Transport (later known as Environment Canada), Gordon McKay was able to use his skills in organizing a conference of world leaders and distinguished scientists. This 4-day meeting, held in Toronto in 1982, hosted 330 delegates from 46 countries, including such high profile visitors as the Prime Minister of Norway. The purpose was to discuss such problems as holes in the ozone layer and the greenhouse effect. Cost of the conference was 1.6 million dollars. It is interesting to note that this is some six times the total cost of Muskox, including all equipment and salaries.

Chapter 7

BAKER LAKE TO PERRY RIVER

The RCAF weekly report for the week ending February 19th, just four days after the Moving Force left Churchill, indicated alarm at the increasing Army demands for more and more supplies. Planners had estimated that all items, including fuel, food, spare parts, emergency extras, and replacement for things lost or damaged would add up to no more than 3,200 pounds per day. The Army was now talking 25% more, or 4,000 pounds daily. Air Force estimates of the new commitments were that the boys in brown were really asking for an additional 45%. Figures released by the Army at the end of the Exercise showed that the true increase over the whole period was 50%. So much for planning!

Knowing that they would have to step up operations to meet the additional obligations, the aircraft maintenance crews were put on two 12-hour shifts, to work around the clock. Plans made for re-supply drops once every six days were altered to allow for drops every second day. As bad weather could prevent such frequent supply missions, the ground party would have to accept some shortages.

Working from Yellowknife the Air Force was busy hauling freight to Cambridge Bay. When the stock of rope and dropping gear ran short, they landed a wheeled Dakota on the Bay ice. This, a first and a feat, as there was no flying control or even a runway. Also nonexistent were tractors or any equipment to scrape out a runway on the ice. The landing was original, but not unique. Later, when the Force reached the port, several Dakota landings were made, all in one day.

The village of Baker Lake consisted of RCMP and Hudson's Bay Company Posts, [Roman Catholic and Anglican] Missions, and eight Eskimo shacks or igloos. Prior to the arrival of Rowley and his men, the Caucasian population had been five - one Mountie, the HBC Factor, two priests and the Church of England minister. The igloo homes were made mainly from ice blocks, as in the early part of the winter there was not enough snow to build snow homes. Ice blocks 4 ft by 6 ft were used, and smaller snow blocks for the roofs and entrances. Some 30 years ahead of the fellow Canadians in the prairie cities, the natives had learned to join buildings together using underground passages. One such set of igloos, connected by tunnels, served as a 'hotel' for visiting trappers.

March 3rd and 4th were set aside as rest and repair days, but little work could be done as there was a shortage of spare parts, and bad weather prevented deliveries. On the 5th a plane landed, not only with spares, but with senior officers from RCAF HQ in Ottawa. Jack Showler had been telling these officers his troubles, so they proposed cutting the Force to eight snowmobiles. A compromise was reached, and the decision made that ten machines would be used for the balance of the trek.

Manpower reductions made it necessary that two of the five American observers leave the Force. As an option they were offered a dog team trip from Coppermine to Cambridge Bay, and this challenge was quickly accepted. Lt. Col. Frank Forrest, paratrooper, and Lt. Commander M.C. "Shelly" Sheleshyak, U.S. Navy Doctor, were the two intrepid individuals. Neither had previous Arctic experience, but jumped at the chance to see the North from the standpoint of the natives.

At 0800 hours on the 6th the ten snowmobiles left the comfort and civilization of Baker Lake behind. Moving north-west along the Thelon River, they reached Shultz Lake by noon, having gone 34 miles. They turned west, a navigational error which put them seven miles off course. Dodging boulders and avoiding the hills they suddenly encountered, they slowly worked their way back to the shore. The machines were then put in high gear, and the run to the north end of the Lake completed 64 miles for the day. The temperature was 23 below, and visibility at times down to 25 yards. It had been a record of sorts for the day - no mechanical difficulties.

Two new problems faced them as they moved north from Schultz Lake: no navigational reference points, and a different terrain. On the map the north estuary of the Lake was marked by a broken line, and above this line the chart was blank, with no geographical features. Henceforth navigation would have to be strictly by dead reckoning, confirmed by astro shots where possible. As steep hills loomed in front, with deep soft snow trapped on the lee sides, it was evident that no matter what route was tried, it would be heavy going.

To avoid the snowdrifts, it was necessary to uncouple the sled, move the snowmobile ahead to firm ground, and use a long cable to pull the sled alongside. Sleds did not react favourably to this treatment, and the runners became ragged and often broke. This was the area where they expected to see some of the exercise's namesakes, muskoxen, but none were observed. Instead, a few lemmings skidded across the trail. Vehicle #5 broke its steering yoke, and #3 its tiller bar. The bar was replaced by a pipe wrench, which served as a good replacement. Despite four hours lost to repair jobs, a distance of 50 miles was made for the day.

At 9 a.m. on the 8th, three Dakotas appeared overhead and began dropping. The parachute on one gas drum failed to open, so it took an hour to dig it out of the deep snow. The mail was not securely packed, and the box broke as it fell out of the plane. Maj. Sangster found an apt simile: "It was a sad sight to see the mail fluttering away in the breeze like a pamphlet raid in Europe." Most was recovered, not all, and the party moved on at noon. Fields of large boulders and more snowdrifts impeded progress, so only 16 miles had been travelled by 7 p.m. when they stopped for the night.

Gord Sangster had become quite philosophical regarding the lack of navigation aids. He wrote: "When you set your course from a reference point on a map and subsequently find the reference point to be 20 miles off position, it introduces a certain amount of sport to the trip. You either get where you are going, or end up somewhere else. So what? Comes night you pitch tents, get the stoves going, and don't care where you are."

With a 0500 hours reveille it was possible to get started by 0740 on the 9th, but the rocky road was playing havoc with the vehicle suspensions and the sleds. The runners had 650 miles of wear and tear, and were beginning to break up. New runners were hastily ordered and the old ones reversed, allowing for a few more miles of use. Fifty-two miles were covered in 121 hours of sled bashing, and camp set up on Lake MacDougall.

Departure on the 10th was delayed when a front wheel came apart on the lead vehicle of 2nd Division. A spare was installed within two hours and everyone was away. In spite of continuing sled trouble, 32 miles for the day was achieved by late afternoon. Again a formation of three Dakotas appeared overhead, initially giving rise to cheers, which later changed to jeers. Two attempts were made to drop new sleds, one even using two parachutes, but both failed, and the product was reduced to kindling wood. Another aircraft dropped a strange item. It was a steel band of the type normally used to wrap a bundle of sled runners, but it was devoid of any runners. Where the loss had occurred was never explained. The troops were forced to carry on as best they could on the scarred runners.

The 11th was a carbon copy of the 10th. Breaking camp at 0800 hours, they crossed the Arctic Circle at noon, and stopped for lunch. Then they were to witness yet another useless air drop, where the sled broke on landing. Included was more fuel and food, which survived the fall okay, but which had to be left behind. As there were only a few serviceable sleds, there was no way to move cargo. Discouraged by their bad luck, they established camp in the early evening.

They were now travelling through country that had not seen white men for more than 100 years. Sir George Back had explored the region in 1834,

following the river from Contwoyo Lake in the west to its mouth on the Arctic Ocean in Chantrey Inlet. First named the Great Fish River, its name was later changed to honour the British explorer. While the natives on the coast had been familiar with white men, here the inhabitants had never seen any, and lived in isolation. The land was not completely desolate, as caribou and arctic wolves were observed in large numbers.

Baird encountered many problems in trying to navigate. His maps would show a river flowing north, but the actual river would be going east. Cloud and blowing snow obscured the sun and stars, preventing any use of the astro compass. The magnetic compasses which were mounted in the vehicles were too unreliable to trust, so dead reckoning was the only way to go.

Two days of southeast winds blowing at 25 mph had caused low visibility, but the temperature rose to -3°F (-20°C), the warmest to date. On they moved straight north along the Pitok River, finding it to be a series of small lakes linked together by rapids. When the river froze, the water under the rapids would drain down to rock level, leaving a layer of shell ice above. Three “snows” in succession fell through the ice, and time was lost pulling them out. More time was spent in finding overland routes to avoid shell ice, and the task was made difficult by steep banks on both sides of the river.

During the search, they were happy to see signs of other life. Komatik tracks made by an Eskimo sled cheered them as much as ‘Friday’s’ footprint in the sand cheered Robinson Crusoe. At sundown they encountered an Eskimo family driving two komatiks laden with furs and caribou meat, so knew they were near to civilization.

It had been assumed that the settlement of Perry River would be on the delta shore, but instead it was on an island in the middle of the river. Luckily, once again the Eskimo family showed up, and acted as guides to the village. It consisted of six wooden buildings and five igloos. No white trading post here, but an operation run by an enterprising Eskimo named Ungelalik. He was the owner of a small schooner, anchored in the frozen river. Greetings were exchanged, with some difficulty in communication, as only one man in the settlement spoke English.

The troops and their machines were first inspected by the men of the town, then by the women, resplendent in print dresses. The women’s colourful tattooed faces suggested that this was a special occasion. Finally came the children, who were given so much candy and biscuits that they quickly developed stomach pains. The people appeared to be wealthy compared to others seen along the way; however, many showed signs of tuberculosis.

There was never any doubt but that the natives were friendly. While the Force members were trying to cook their evening meal they found their tents

invaded by curious groups, wishing to learn how the strangers lived. Earlier, the locals had attempted to assist in the tent pitching, but had been puzzled by the placement of the poles and pegs. The language barrier was resolved, with much laughter, by the use of signs. Apparently the native men found it very amusing that the Army did not bring women along to perform the tasks of camping, cooking and housework. This also amused the women, and in particular the teenaged girls, who burst into uncontrolled giggling at the sight of men carrying out domestic duties.

In the years following the Second World War, the Canadian Armed Forces have demonstrated that they can be all heart. Flying food to starving populations, search and rescue missions, and peacekeeping for the United Nations are all examples of good works. In recent years they have been awarded a share of the Nobel Peace Prize. The Muskox Force had a chance to participate in this role, as during the night of their stay in Perry River, a medical crisis developed.

A four year old Eskimo child was brought to the Medical Officer for diagnosis. Lt. Colonel Bob Croome found the child to have a ruptured appendix with peritonitis, complicated by pneumonia. This critical condition demanded an immediate operation. Poor flying weather prevented any possibility of pre-operation evacuation, and post-op treatment in a hospital was essential if the kid was to survive. After completing the operation successfully, Dr. Croome felt he must remain with his patient until air evacuation could be arranged.

A flurry of messages arranged for a shuttle of Medical Officers, sending F/L Whillans from Yellowknife to Cambridge Bay to serve there if needed by the Force, while Dr. Croome stayed behind. On February 15th he flew with the child to the hospital at Norman Wells, and then returned to Cambridge Bay. The Force had no doctor for the 140 mile run from Perry River, and the RCAF logged an extra thousand miles of flight. But the child survived, which compensated for all the extra effort.

An interesting sidelight to this mercy mission was that at the outset, F/L Bill Carr was sitting in Baker Lake with his Norseman hoping to have a part in the operation. Those in charge decided that Carr was too inexperienced to make the hazardous flight, and the job was assigned to ex-bush pilot S/L Joe Coombes, who did the job. It is hard to understand why Carr lacked experience, as the very next week the RCAF report stated he was "the best of the three

Norseman Captains,” although it added “with the exception of S/L J.S. Coombes.”¹¹

¹¹ *Author’s note:* F/L W. K. Carr, DFC, had flown Spitfires overseas and was later to become the best known man in the Air Force. He served as the senior pilot on Royal and Prime Ministerial Flights, both nationally and internationally. After service as the Commander of Training Command and Deputy Commander of NORAD at Colorado Springs, he attained the rank of Lieutenant General. He was the first Commander of Air Command when it formed in 1975, ending the Armed Forces unification that had been introduced by Paul Hellyer in 1968.

Chapter 8

MAGNETIC MISSION

For the first time since the troops had left Camp Shilo, back in December, the temperature went above zero Fahrenheit, with a maximum of +1 on the 13th. Mild conditions continued on the 14th, when at long last a successful air drop of sled runners was made at 1130 a.m. These were immediately installed, and at 1:30 in the afternoon all bade good-bye to their Eskimo friends. Once out on the smooth frozen sea water of the Queen Maud Gulf, machines were put in high gear, giving top speed but lowering fuel consumption at the same time. After a 62 mile run they camped in the middle of the Gulf, near Fitzgerald Island.

On the 15th reveille was at 5 a.m., and with a 0730 take-off they completed the 79 miles to Cambridge Bay by 5 p.m. There was considerable overheating due to the fast travel and the mild temperatures, but apart from a damaged wheel, that had to be replaced, and a broken suspension bolt, troubles were minor. The barrier ice along the shore slowed their progress at the end, and just as they entered the Bay the visibility dropped to 500 yards in blowing snow. They could see the RCMP ship "St. Roch" frozen in at the dock, and Amundsen's old barque "Maud" rotting on the beach.

The majority of the Force was to spend a week at Cambridge Bay, while three "snows," each with five men aboard, made the overland run to Denmark Bay, 120 miles north-east. Those who stayed behind were offered shelter in the Hudson's Bay warehouse, but it was so chilly they opted to pitch their tents instead. Weather was exceptionally mild, up to +16°F (-9°C). Although they were now north of the Arctic Circle, 13 hours of daylight were enjoyed, compared to the 11 hours they had experienced on leaving Churchill. Some of the more enterprising men found bunks in the RCMP Barracks, or on board the "St. Roch," where about a dozen squeezed into the ship's cramped quarters.

Sub-Inspector Henry Larson, the Norwegian-Canadian skipper of the RCMP boat, was already famous as the first to navigate the Northwest Passage in both directions. He had taken the schooner eastward through Dolphin and Union Straits, Coronation Gulf, Queen Maud Gulf, and north of the Boothia Peninsula to Lancaster Sound in 1940-42. Then made the westbound route in 1944, by a more northerly track through Parry Channel and the Prince of Wales Strait. He entertained one and all with tales of his adventures, and explained why Cambridge Bay and many other places in the Arctic were misplaced on

maps. Errors accumulated in the early explorers' chronometers as they moved west, so while the latitudes might be correct, the longitudes were often wrong.

On the 16th a conference was held aboard the *St. Roch* regarding the Denmark Bay excursion, which had the objective of conducting special observations of the Magnetic North Pole, for a 24-hour period. No air supply would be provided, so the group would take just enough to last them four days. Departure was set for the morning of the 18th. The next day, the 17th, was St. Patrick's Day, but no time was spent honouring the Irish. Instead, new engines and suspensions were installed in the snowmobiles, with the odd break to admire the Dakotas landing on the ice, without, benefit of a runway.

To give it its full scientific name the Geomagnetic North Pole had first been found under King William Island in 1831. It moves northward at the rate of about 3 miles or 5 km per year, so in March of 1946 it was near the north end of Prince of Wales Island, 150 miles north north-east of Denmark Bay. By 1980 it was some 500 miles closer to the geographic North Pole than when first identified, so eventually the two poles may be quite close together.

Mr. M.J. Innes, of the Dominion Observatory in Ottawa, had travelled with the Moving Force making magnetic observations along the way, but his prime job was to be determining the exact location of the Pole. In May of 1945 the "Aries," a Lancaster Bomber of the Royal Air Force had flown from Edmonton over the polar route to Britain. It had reported that the Pole was 200 miles northwest of its previous location on the Boothia Peninsula. Ottawa scientists did not believe the story, and wanted Innes to check it out.

Early on the 18th the Party took off on their scientific sovereignty mission. Canada would have to share the geographic Pole, but this one would be found in Maple Leaf territory. Sangster and his engineering staff were along, testing a new cooling system. It was found to be no better than the old one, as the radiator boiled after 10 miles of running. With a new fan belt installed, and more modifications to the system, things remained cool enough to cover 69 miles in the rolling country.

The next day large boulders and gravel ridges slowed movement, and a broken sled runner had to be replaced. Inspector Larson had explored the area by dog team some years earlier, and built cairns to mark the location of Denmark Bay. His cairns were not to be found, in spite of an intense search for half a day. Finally they hit on a spot, built their own cairn, took photographs, and began the 24 hour vigil. The location was 12 miles from that shown on the maps - but these had been made by early seafarers who had never landed on shore.

Next afternoon it was southward once more. As the temperature had dropped 33 degrees overnight to 25 below, things were back to normal. After

five hours of travel, a broken steering yoke stopped them for the night, leaving 64 miles to go. On the 20th they made it back to base, pausing along the way to pick up a lemming as a pet. After a half-hour ride in the cab, it was found that he was not housebroken, so he was released back in the wild. On return to the settlement, they learned that their buddies had used all the rum ration to throw a party for the locals. Fresh rations, including one chicken per crew, had been flown in at great expense, but was also all gone. To add insult to injury, the comfortable billets they had initially found in warm buildings all had new occupants.

Ten men from one division had found an Eskimo trapper's house empty and bunked there, all in one room. They got the stove going, and themselves nicely bedded down, when the owner returned. As he had acquired two white foxes, he thawed and skinned them, leaving the bodies standing upright by the stove. The atmosphere became somewhat polluted, and the crews were to regret moving from their tents.

The men who were not involved in the Denmark Bay trip could be divided into workers and drones. The industrious ones, mainly scientists, spent the time working on reports and records; the others looked for fun. The American observers developed a love of dog sledding, as Col. Edwards and his civilian helper, Mr. House, went off on a climbing expedition with an Eskimo guide. They reached and ascended the slope of nearby Mount Pelly. At the same time their two colleagues were leaving Coppermine for the run across the Coronation Gulf. Everyone was happy, as mail arrived for the first time in two weeks.

Once the Moving Force reached Cambridge Bay, Churchill ceased to be effective as a base for flying operations. Flying time from either Yellowknife, or Norman Wells, to the Force's location, would be shorter. Beginning on the 17th, Churchill was evacuated, as 18 Dakota loads flew west. The plan had been to concentrate all resources on this move, and there was supposed to be a ten day break in any supply flights to the Force. No such luck. The Army asked for six trips to Cambridge Bay. The list of equipment to be taken to Norman Wells was revised four times. Each time the RCAF thought they had received a firm figure, it would be altered, always larger.

This turmoil led to statements in the weekly report to the effect that: "It is strongly recommended that in any future exercise involving air supply to the Army ... the Army personnel be given previous instruction in the use of air supply. They appear to regard a few tons of equipment as of little consequence ... [they] are anxious to co-operate to the maximum extent, but appear to lack experience in differentiating between an aircraft and a ten ton truck." By the

end of the Exercise this complaint had been forgotten, as the final RCAF report stated: “co-operation between the two services was always excellent.”

No. 1 ASU was not only having hassles with the Army, the FIK was also providing headaches. A series of messages and letters arrived, which in tone, if not in context, indicated that the Baker Lake airstrip would have to continue operating. Just a few hours prior to the final evacuation of the base, official word arrived to state that only weather and signals personnel were to remain. Thus flying was terminated for a time. Six weeks later the FIK reversed itself, and ordered the strip re-opened.

Back at Cambridge Bay the gang of ten living in the trapper’s house split, and some went back to their tents to find clean air. Four bravely remained, trying to avoid the 30 below temperatures outside. While cooking their lunch on the 22nd, they were joined by a dozen Eskimos of varying ages and sexes, eager to try white man’s cooking. In addition to the two foxes still beside the stove, a 150 pound seal had appeared, the carcass standing on its nose by the stove. The officer acting as chef opted for stew, hopeful that any stray pieces of fox, caribou or seal would blend with the beef. The strategy worked, as the meal was enjoyed by all.

Chapter 9

CAMBRIDGE BAY TO FORT NORMAN

On Saturday, March 23rd, the Force took off again across the sea ice towards Coppermine. They encountered barrier ice on the Coronation Gulf almost immediately, but managed to skirt around it. At speeds of 5 to 10 mph they had travelled 30 miles by afternoon, when heavy snow began to fall, reducing the visibility to half-a-mile. The first division was able to go another 30 miles before pulling in to shore to camp. Second division vehicles had engines overheating, radiator troubles, fuel stoppages, suspension separations, and the usual sled troubles, so they only managed another 13 miles. Both groups missed meeting the U.S. dogsled gang going in the opposite direction due to the heavy snow.

The next day they were able to get away from the shores of Victoria Island, and out on the smooth ice of the Gulf. The two divisions were still separated and were, in fact, incommunicado. Both radios in 1st Division were no good, and the only radio in 2nd Division was in the vehicle with transmission trouble, so its crew were only worrying about repairs. Exceptionally high fuel consumption was still a problem, so they were happy to have 16 drums of gas dropped at sunset. The trip to Coppermine was expected to take two days, this time had now passed and they were barely one-third of the way.

Late on the 25th the two divisions, now re-united, found a wireless expert who got the radios working. The persistent easterly winds, blowing into the rear ends of the vehicles, gave overheated engines, and fumes to the cabs. Blowing snow cut the visibility below a mile, so navigation had to be by compass. The route took them past Walton Island, where the basalt cliffs jutted out into the sea like Gibraltar. In the cold it was difficult to think that volcanoes had once been common in this region.

Travel on the 26th was uneventful. There were the usual overheating problems and 28 mph winds gave blowing snow and low visibility. Ice barriers as high as 15 feet forced the occasional detour, but after a 64 mile run, it was only one day more to Coppermine. The misadventure of the day for one crew was the explosion of a can of bacon, put on the stove to thaw for the evening meal. Not only was the inside of the tent badly soiled, but the meal became part of a vegetarian diet.

By morning of the 27th the overall fuel supply was very low, but for breakfast the ASU delivered six drums of gas. Thirty-nine miles were achieved by lunch time, when bad luck struck once again. Vehicle #2 broke its rear

suspension, then had carburetor trouble, and finally broke its differential. So for the last 35 miles it had to be towed. Meanwhile the 2nd Division had taken the lead, but outsmarted themselves trying to reach Coppermine in daylight.

Believing they were taking a short cut around an island, they went up a small river, and got stuck in shell ice. As compensation they saw trees for the first time in 1500 miles. These were mere shrubs, less than two feet high, but they were something different from snow and rocks. Realizing that they were up the proverbial creek, with the ice below getting weaker by the yard, they turned tail and went back out to sea. Back on track, they reached the settlement at 9 p.m. The 1st Division, hampered by the towing job, did not make it until the early hours of the 28th.

The 316 miles had taken five days instead of the planned two. Their only consolation was that the two American observers, on the reverse route via dog sled, needed ten days to complete the distance. The settlement at Coppermine was similar to other Arctic points, with RCMP and HBC Posts, and [Roman Catholic and Anglican] Missions. There was one welcome addition, a DOT radio and weather station. This link with the outside world was kept busy, as messages could be sent to loved ones down south. Lt. Cols. Baird and Croft took a flight as far south as Port Radium, to reconnoitre the route, while the balance worked to overhaul the machines.

Early in the morning of the 29th a glider was landed, bringing mail, spare parts and a new engine. The Force was supposed to be advised that this bonanza was coming, but communications somehow broke down. No one was ready to unload the cargo, but once begun, the job was done quickly. After 35 minutes the empty glider was snatched off. This had been a record-breaking performance to the Army, but to the aircrew making endless circles in the sky it seemed an eternity.

The temperature had fallen to 33 below on the 29th, but jumped to plus 12 on the 30th, accompanied by heavy snow and half-mile visibility. The move south had to be postponed. Late in the evening it cleared, and an exceptionally brilliant aurora display was visible. Some members worried about how to get cash money in a town where there was no bank (plastic money had not yet been invented) so they could buy furs. Bargain prices prevailed - \$13.00 for white fox and \$8.00 for red fox. J. Tuzo Wilson joined the Force, to make the overland trip to Port Radium.

Departure from Coppermine was at 8 a.m. on Sunday, March 31st. It was necessary to swing out to sea, and then inland, to avoid the rapids of the Coppermine River. Snow was about three feet deep, and it was uphill going through mountainous country. The average speed was only 2 mph. To climb the hills it was necessary to uncouple the sleds and pull them up afterwards by

cable. Scrubby trees appeared to relieve the white of the landscape. As they headed south-west towards the Dismal Lakes, steep basalt cliffs were visible on both sides of the route.

Hot antifreeze badly scalded the face of a driver when he lifted the cap on a boiling radiator. The degree of burns made evacuation essential, but the weather was terrible, and the hilly terrain prohibited landing of any airplane. Dr. Croome applied salve and bandages, and took the man into the medical vehicle. Luckily, no damage to the eyes was evident.

Mild temperatures and heavy snow hit them on April Fool's Day, with the mercury up to +21°F, and visibility down to 40 yards. Then a cold front passed through, the snow continued, and the temperature dropped back below zero. North-west winds of 35 mph picked up the fresh snow to produce a wall of whites. The 1st Division had camped the night before some 14 miles ahead of the 2nd, and wisely decided not to move at all. 2nd Division, trying to catch up, managed to make the 14 miles at one mph, arriving in the evening. After a day of foot slogging, straining to find and follow the trail, they were happy to get help from their buddies in setting up the tents. Still, there was no chance for an air evacuation for the burn patient.

The strong winds continued on the morning of the 2nd, with near zero visibility restricting speed to a crawl. The ill wind was blowing some good. It packed the snow down to a hard crust, making for much easier going than the deep loose snow. 1st Division reached the Dismal Lakes at 5 p.m. and found a Norseman waiting to evacuate the casualty. Unfortunately, he had been waiting a long time, and his engine refused to start. The next afternoon, after many attempts, the engine caught, and the patient was on his way to Fort Nelson.

In spite of their name, the Dismal Lakes proved to be a cheerful place. There were willow trees, and some spruce of Christmas tree size. Early on the 3rd an air drop brought a supply of smokes, candy and magazines to boost morale. A Norseman landed with spare parts, and when it departed it took Lt. Jim Croal along. Croal was the Royal Canadian Navy participant in the Exercise, and was to conduct a survey of the south end of the route, using his knowledge of water travel. He would study the rivers, and construct ferries or bridges as needed. Although the American Weasel had failed in the snow and cold north of Churchill, one was brought to Fort Nelson. As it was amphibious, it could ford swamps and streams.

Improving weather sent the 2nd Division off at 11 a.m., to cover 33 miles by evening. 1st Division was delayed until 5 p.m., but only made 11 miles before a connecting rod broke, meaning a new engine had to be ordered. The replacement did not arrive until the late afternoon the next day, so no progress was made on the 4th. 2nd Division had pushed on for 28 miles, and reached a

point where they could see the waters of Hornby Bay on Great Slave Lake, but could not figure out how to reach them. A seemingly impenetrable barrier of trees combined with ridges of boulders and gravel blocked their path.

Maj. Sangster went ahead on foot, trying to work his way around rocks and small trees in snow that was hip deep. After an hour's search for the best roadway, an all-out charge was made, knocking down the trees to reach a clearing. Again the path was blocked, but, encouraged by their previous success, another flat out dash was made, which carried them through the remaining trees to the Lake shore. While trudging through the snow Sangster had noticed tracks of fox, wolf and bear, and suddenly realised he was unarmed. No creatures were encountered, so there was no chance to test the friendliness of the local population.

The next 40 miles to Port Radium took five hours, for although the ice was smooth in places, there were many snowdrifts and pressure ridges to hamper progress. Small islands and shallow water under the ice brought back the old problem of pitching, and restricted high speeds. Crossing the Arctic Circle once again, everyone was glad to be heading south. Disaster struck on the final run into Radium when Dr. Croome's vehicle attempted to cross a pressure crack diagonally, fell into the water, and tilted to a 45 degree angle. The crew was able to climb out, as the cab half filled with water. When the Doctor went back to rescue medical supplies, it took several men to extricate him.

Radium was only about a mile away, so they radioed for a tractor to come and help. One snowmobile was safely across, and there were three to come. Two were hooked by cable to the sinking vehicle to prevent further slippage. The plan was to get the tractor to the other side of the crack, so that the power of four machines could be used to retrieve the Doctor's vehicle. In the hope of doing this safely, a cable was attached from the free snowmobile to the tractor, and it started to make the crossing. When it hit the edge of the crack, the taut cable somehow caused it to do a back somersault, crushing the driver underneath. Both the tractor and driver slid into the water. As the snowmobile joined by cable also began to slide towards the hole, it had to be cut loose.

The fatal tragedy was reported to the town by radio, and the mine staff responded immediately. A truck came out to bring in the troops, and their machines were left on the ice overnight. It was now after midnight, so the crews were given a hot meal, and finally got to bed at 3 a.m. They were billeted in homes and offices, but did not want much sleep, and were up and out on the ice within four hours. The mine staff was there to help, and built a timber bridge across the crevice. Using block and tackle both machines were extricated, and the body of the tractor driver recovered the next day.

1st Division had logged nil miles on the 4th, but got the new engine installed by evening. Reveille was set for 0400 hours on the 5th, so the 95 miles to Port Radium could be covered in one day. The weather turned against them, as the +15 temperatures of the previous day fell to -27° overnight, and the engine on #3 vehicle would not start. Attempts to warm it with a hand crank heater merely proved that the heater also refused to work, so a blow torch was applied. This did the job in two hours, and they were away by 8 a.m., reaching the Lake at 6:30 p.m., and sped over the ice to reach Radium by 11:00 p.m. They were met at the bridge by friends who guided them over the crack, and on into town.

The many delays of the past five days had restricted their progress to only 178 miles. Stress and the hard life on the trail was making many grouchy, and more anxious than ever to get home. Luckily, for once the planners got something right, as a glider, equipped as a mobile workshop, had been delivered to Port Radium a day or so earlier. Quickly the mechanics set about changing engines, replacing tracks - those of the Doctor's vehicle had been cut off when trying to free it from the water - and performing general maintenance indoors.

Morale improved during the two-day layover at the mining town. Some men were living in the commissary building, others in the recreation centre, where they slept on the pool tables. They had real food - as opposed to rations - which was served to them on real china plates in the dining room. It was a novelty to have fresh fruit and vegetables, whole eggs, and everything prepared by professional cooks. Best of all were the hot showers, as they had not been able to bathe for 52 days. Their hosts took them down the mine on sightseeing trips, but they found the shafts both dark and damp. Water seepage was the major problem, strange in a land where the surface temperatures for much of the year were below freezing.

Trading sessions with the miners resulted in all the soldiers' being weighed down with samples of ore (in those days most people equated the value of uranium with that of platinum). The flak jackets of modern-day troops would be ethereal if compared to a parka with six pockets full of rocks. They did not allow the extra personal load to hold them back on the 8th, when they headed south following an old tractor trail on the Lake ice.

After 40 miles of unimpeded travel, more pressure crevices opened across the path. Some were as wide as eight feet, almost the length of the bridge-building timbers they were carrying. While testing a bridge, the Colonel's vehicle broke a plank and sunk down three feet, but managed to make it to the other side. The others searched lengthwise along the crack until they found a firm ice bridge to use as a crossing point. As they had gone 71 miles in 12 hours, they pitched camp in the dark on the ice.

Dead reckoning again became the only means of navigating, as they were in the middle of the Lake, out of sight of land. Soft snow on top of the ice made travel slow as low gear had to be used. A Norseman brought them more 4 by 6 timbers for bridging purposes, and a Dakota more gas. For the first time the temperature went up to melting (+32°F or 0°C), and tail winds caused the usual overheating. Herds of caribou, as many as 200 head, were seen. Avoiding the temptation to bag some fresh meat, they went on, completing 64 miles for the day.

The morning of the 10th was spent moving over the ice to the mouth of the Great Bear River, which unexpectedly was open and running. By the shore there were some deserted buildings, two power boats, and two large oil storage tanks. After climbing the bank through these vestiges there was real joy on finding a gravel truck road. In a clearing near the road was the exercise gas cache, and the machines quickly refuelled before setting off down the road.

High speed travel was invigorating, but it had its consequences. Engines and transmissions overheated, and frequent halts were required to cool things down. After some 20 miles the road narrowed to become highway roadbed under construction, and in the evening, after 86 miles, the road construction crew was encountered. The workers had been forewarned, and led the Force to a group of empty Niessen huts, which would serve as the hotel for the night.

Movement the next day was slowed to a snail's pace. A hill of frozen clay caused the vehicles to skid and slip sideways. The sleds had to be unhitched, then pulled up by means of long cables. Then the structure of the road changed, becoming a semi-corduoy trail. A bulldozer had gone through the day before and randomly knocked down trees. There was fear the logs would foul up the tracks and break suspensions, so these barriers had to be chopped up and pulled out of the way. As Gord McKay described the scene: "Axes were flying and occasionally tempers."

Sleds lost out in their encounters with logs and stumps. Many jackknifed, others rolled over and dumped the load, and one was so badly damaged it had to be abandoned. Tracks were pulled off the snowmobiles, and time was lost in repositioning them over the wheels. Broken steering yokes, fans and oil pumps contributed to five hours of lost time in the first nine hours of movement. One mile an hour was the speed achieved for the first seven hours, and it took nine hours to get 11 miles. Fortunately in the late afternoon they found themselves on a Canol tractor trail, and made the last 24 miles to Fort Norman at a reasonable pace.

Chapter 10

SIC ITUR AD ASTRA ETC

The original plan had been to make Yellowknife the main supply base for the western run of Moving Force to Edmonton. For three reasons the plan was changed. (1) The tractor train contracted to haul gasoline in bulk to the northern town encountered endless delays, so fuel was in short supply. (2) The Army had sent most of its stores, rations and spare vehicle parts to Norman Wells disregarding the plans. (3) There was a great deal of office and sleeping space at Norman Wells in buildings erected for the wartime Canol project. During the third week of March, staff and stores were moved to the airport beside the Mackenzie, and it became the main air base.

With more landing strips and short distances separating them, the ASU developed a new method of establishing caches for the Force. A Norseman would land men and material at the cache site, off load, and wait while one or more Dakotas dropped more cargo. The ground crew would then fill up the cache, pick up the parachutes, and fly back to base. Although the RCAF thought this might ensure enough of everything for the Force's needs, they were beginning to speculate that all 10 snowmobiles were going to have to be rebuilt or replaced before the Exercise ended. (They were correct!)

LORAN (Long Range Aid to Navigation) had been developed to help ships in mid-ocean determine their location. During World War II American scientists adapted the system for flying operations, especially for long distance flights over unmapped territories. It worked on the principle that exact location could be found by listening to radio signals from two broadcasting stations and calculating the time taken for each signal to reach the plane. Effective distance for its use was 700 miles by day, and 1400 miles at night. The Moving Force tried to use LORAN for ground navigation, but without success.

The ASU also found it unsatisfactory because the transmitting stations were in southern Manitoba and northern B.C., too far from the operational area to provide strong signals. The U.S. Defence Department, recognizing that they would wish to fly bombers over the polar regions, planned to establish a network of stations in the Arctic. Baker Lake was to be the first, and it was installed in the first week of April. To reopen the field, F/Ls Cooke and Carr were reassigned to the eastern Arctic.

The installation served the purposes of the U.S. FIK but was of no value to Muskox. Like many military decisions it was "too little, too late." On March 21st the *Edmonton Journal's* front page headline story read "LOCAL B-29s

WILL FLY TO POLE,” and indicated that three Edmonton based United States Army Air Force (USAAF) planes were planning to test “radically different equipment” and would fly over the North Pole. The story claimed that these flights “were connected with the Canadian Muskox Expedition” which was not exactly true.

These polar flights were made, except that the aircraft flew from Fairbanks, Alaska, rather than from Edmonton. The northern network grew, and the next year a LORAN transmitter was placed at Cambridge Bay. Although the USAAF got their navigation aids, they were losing on another front. At this time the American troops, stationed in the frozen north of Edmonton, went on strike, requesting moves home. This was a copy cat strike the RCAF crews had staged in England two months earlier.

The ASU had a new football to kick around, along with their friends in the Army. This was their other bosom buddies, the USAAF. Testing of gliders was going ahead full bore, and one was used to haul cargo on the move from Churchill to Norman Wells. Then more gliders were put into service, and made deliveries to Coppermine, Yellowknife and Fort Simpson, along with the one taken to Port Radium as a workshop. In theory, the crews were jointly American and Canadian, but this did not work. The Americans wanted their own people to gain the experience, so insisted that they do all the take-offs, landings and snatches. Protests that the Canadians were learning nothing fell on deaf ears, even when directed to high level U.S. officers.

While he lamented the lack of co-operation, W/C Jack Showler had already concluded that these machines had limited value in the Arctic. In wartime they were expendable, but in peacetime could not be abandoned. One landed on Blackwater Lake, 100 miles south of Fort Norman, and suffered minor damage when it ploughed into 18 inches of soft snow. It could not be snatched off due to the snow, and eventually a work party had to be landed to build a runway on the Lake.

Showler knew that if 18 inches of snow was going to stop operations, the four to six feet elsewhere in the area would render the gliders totally useless. Unless a suitable ski or toboggan undercarriage was developed, there was a very limited potential for the engineless flying machines. As ski-equipped Norsemen, and wheeled Dakotas better met the needs, it was decided to reduce glider operations for the rest of the Exercise.

Together with Naval Officer Jim Croal, W/C Showler made several reconnaissance missions over the route between Great Bear Lake and Fort Simpson. They took with them Flight Sergeant Fresque, an aerial photographer. He took pictures of cache sites, and of the unused tractor trail through the bush. These were passed to the Force Commander, plus a list of all the errors on

maps, and possible places where river crossings might be necessary. The snow along the way looked very soft, and three or four feet deep.

Since its very beginnings the RCAF had been engaged in the photographic business. Military aircraft had been justified as early as 1924, when they were first used to conduct surveys of the northern lands. Use of photography during the War as a means of selecting targets and assessing damage had led to improvements in cameras and methods. From the post-war period to 1957, much Air Force time and effort was spent in the geodetic survey of Canada's northern territory.

Lieutenant General Andy McNaughton, Canadian war hero par excellence, visited the Base at Norman Wells on April 4th. At war's end he had been appointed Minister of National Defence, but had been forced to resign when he failed to win a seat in Parliament. He was [Chairman of the Canadian section] of the Canada-U.S. [Permanent Joint Board on Defence]. Air Vice Marshal W.A. Curtis, number two man in the RCAF hierarchy, was with McNaughton, so Jack Showler was able to pour out his troubles to a sympathetic ear. The VIPs were given lunch in the Imperial Oil commissary, which served better quality meals than did the military mess.

Logistics developed into a big headache. Fuel was still not available at Yellowknife, as the tractor train was stalled at Hay River, 120 miles away on the other side of the Lake. The bare minimum requirement had to be hauled by air over this distance, and there were handling problems at both ends. Plenty of gas was available at Norman Wells, but there the Department of Transport had control, and refused to release any of it without authorization, which took days to obtain via the proper channels.

Other RCAF necessities were suffering from bureaucratic whims. Such items as Herman Nelson heaters, aircraft jacks, nose hangers, welding equipment, work stands, compressors and hydraulic fluid had been taken to northern sites. Orders now were that these things had to be conserved, and brought back south when no longer needed. The Army had to face a similar rule. Ordinarily the defective parts replaced on the snowmobiles would have been thrown on the trash heap. Now an order came stating that they were to be retained, taken out to Edmonton for study at the conclusion of the Exercise. The troops gave no shouts of joy on hearing these commands.

The ASU was carrying out the fight on six fronts. It was at odds with the Army, the FIK, North-West Air Command in Edmonton, #9 Transport Group in Ottawa, the USAAF, and one of its fellow transport units, #164 Transport Squadron. The last named was located in Edmonton, and was normally responsible for moving goods to northern military locations. It was ordered that

any plane flying north, including those of the ASU, should carry #164's loads. This put yet another load on Jack Showler's strong back.

The FIK had ordered a cache of 2,000 gallons of 100 octane fuel be established at Cambridge Bay. This would be used by future RCAF operations over Victoria Island. Inspector Larson and his RCMP officers were to guard the fuel until they left on their summer voyages. Next came an order to haul 10,000 gallons to Yellowknife, while at the same time two aircraft were taken from the ASU for other duties. The remaining planes were close to the point where they required major overhauls, and so would have to go south for indefinite periods of time. As a result, loads increased.

At the beginning of the Exercise, there had been two American aircraft taking part. One was assigned to the ASU, the other acted as an observer. The RCAF had been instructed to give a minimum of publicity to these two planes, and no one wanted the impression given that the whole thing was an American exercise. But by late March there were a total of 5 U.S. transport planes, and seven gliders, one which had engine power, loosely working with the ASU. They had brought their own public relations officer, who was sending stories back to Washington. Showler pointed out that these American resources were not really helping the exercise, and that the Canadian public should be made aware of this fact.

Even the one crew which had been placed under RCAF control was not always loyal to its new country. The weekly report for the end of March stated: "The American aircraft are not nearly as useful as may be thought, as they are quite undependable, proceeding from time to time to Edmonton and points south, and staying away for considerable periods. As an example, the Transport Command machine has not been here for over three weeks, although ten of their personnel continue to live here, occupying quarters." It seemed the U.S. crew believed in R & R for themselves, but not for their ground support men. They may have later boosted the morale of their mechanics with stories of the fun in New Orleans and/or other southern fleshpots, but Jack Showler was not amused. The RCAF motto, instead of translating as "thus is the pathway to the stars," changed to become "is the pathway to the Stars and Stripes."

Chapter 11

FORT NORMAN TO EDMONTON

April 12th was a day for rest and repair at Fort Norman. It was very pleasant, as the temperature remained above freezing, and climbed to +38°F in the afternoon. In the village they were pleased to see signs of civilization - dogs, a horse, and even a potato garden. With long hours of summer daylight, this Irish crop grew successfully in the northern latitude. Dress of the natives who lived on the river flats below the settlement was colourful, and their dogs sported brightly braided yarns on the leather harness. The native love of bright colour was carried into the [Roman Catholic] Church, where brilliantly painted hangings decorated the walls.

Fort Norman is located at the junction of the Mackenzie and Great Bear Rivers. To the north stood "Bear Rock," a majestic high cliff, which served as a backdrop for the settlement. Three miles down the Mackenzie were smoking coal pits, which had been burning for centuries. These had first been discovered for the outside world by Alexander Mackenzie on his trip down the river in 1789, and were still burning.

Another attempt was made to find a good use for the gliders, this time as an ambulance. Dr. Croome wrapped himself up in bandages to look gravely wounded, and tried to test the possibility of quick casualty evacuation. His charade failed, as the cable came loose from the tow plane, and the glider just made it across the river. The next day the glider did get aloft, but it appeared that this was not the fastest way to move the wounded.

The decision was made to have all vehicles pull only one sled each, rather than the two they had been burdened with to date. Loads had to be adjusted, and the surplus given to the Air Force to take out. Winter gear such as mukluks, overpants, and even parkas were left behind, and restrictions put on the food and fuel to be carried. Luckily, no harm was done, as the temperature only went below zero on two more occasions before the finish of the trek.

On April 14th the Force set off once more, moving east over the 23 miles of road until they reached the tractor trail running south. An advance party of two machines left at 5 a.m., and the main group three hours later. For a while all went well, and top speeds of 20 mph were reached. Then things went wrong with a vengeance. Vehicle #5 broke its steering yoke and #2 the fan belt. Things went from bad to worse as #11's transmission went out, and then the suspension and transmission both broke on #8. This meant that there were two engines which would have to be immediately replaced. Dr. Croome injured his

hand when it got caught between two vehicles, and the driver fixing the fan belt on vehicle #2 was burned by the exploding radiator. For mechanical difficulties, it was the worst day so far.

A three-way split of the Force resulted from these problems. Two “snows” were camped 63 miles down the road, five at the 60 mile mark, and the last three at 53 miles. #11 was stopped in dense bush, so had to be towed several miles to a lake to receive its replacement engine. The necessary engines and parts arrived the next day, and were quickly installed. Meanwhile the seven frontrunners did manage to move 17 miles. As high daytime temperatures were causing melting and soft footing, the decision was made to only travel at night.

On the night of the 16th there was bright moonlight, which gave the opportunity for rapid travel, and 92 miles were covered, and the Force reunited by noon on the 17th, when all stopped to camp. The engines, which had overheated at 30 below, ran very hot at 40 above. Rear plates of the radiators were removed in an attempt to cool things down, but this only gave temporary relief. When they camped on Blackwater Lake, the hot afternoon sun was so invigorating that some of the men sun-bathed on top of the vehicles, instead of trying to sleep.

As it was up to +48°F on the 18th, no movement was tried until after midnight. The snow was soft, and two and one-half feet deep, so speeds of three mph were all that could be attained. Pushing on until midmorning, they covered 33 miles, with the irregular hours and lack of sleep making many grouchy. The 19th was Good Friday, and for a special treat they had a new American 10 in 1 ration, consisting of spaghetti and meat balls, with peanuts for dessert. Making and throwing snowballs became the sport of the day.

The system of using one or more snowmobiles to break trail was paying off, as the followers could make good time on the packed trail. Breaking camp at 8 p.m. on the 20th, travel was initially good, but as the temperature stayed above freezing all night, progress was slowed when the path became uneven. A fire in Col. Baird’s #1 vehicle damaged the radio and singed Lt. Col. Croft’s hair (Croft was British, and even in those days the Brits wore their hair long), as well as the interior of the cab. They came on to an area of burnt and felled trees, the result of a forest fire. There were many deadfalls and windfalls, with stumps up to 18 inches in diameter. Cutting a path through this obstacle course took time, so in four hours they only managed to go one mile.

Although the Force was now spread out over several miles, with the leaders close to Fort Simpson, the decision was made to keep going. Early in the afternoon they reached once again the banks of the Mackenzie, and could see the radio towers of the Simpson airport in the distance. On the river ice there was a great deal of slush, and water lying three feet deep in places. As Gord

Sangster put it: "Snowmobiles don't float, but they will do a deep wade safely." He added that the only reason he did not have his fingers crossed while moving over the wet ice was that he was sitting on the roof, holding tight with both hands.

Once on the west side, they did not stop to visit the collection of log huts which made up the town of Fort Simpson. Instead, they moved down the main street, and off along the red mud road to the airport, 12 miles away. They had been going for 22 consecutive hours, and had gone 101 miles. This was a record, and a mileage that was only exceeded later when driving on the highway. After 24 hours without sleep, they were all in bed before midnight. The 21st was Easter Sunday, and as traditional fare was not to be had, they made do with wieners and beans. A two day halt was called for repair and repacking.

Wading around in the mud and puddles the next day brought home the fact that there would be tough slogging ahead. There were still six rivers to cross, and the mercury was up to 54 degrees. New engines were installed on two machines. Various methods were tried to improve cooling, such as bending the fans to a different shape. None were really successful. Although the airport was closed to traffic due to water and slush on the clay runway, an intrepid American pilot did land, disregarding the order. Cameras were loaded and aimed, ready to record the disaster, but the plane came down successfully, with flying mud and ice bashing the wings and flaps. It delivered two tracked trailers, to be used experimentally on the run south. In the 50+ weather the snow had just about all gone.

Early evening on the 22nd they were off again, south-eastward on the Mackenzie to get to the Liard for the run to Fort Nelson. The Liard River proved to be a scary place, with slush and water on top of the ice to a depth of two feet. As they crossed, the mush piled up in waves three feet high in front of the machines. One vehicle towing a tracked sled had to remove the tracks to convert it to a sleigh. However, all made it safely across. Gord McKay, the meteorologist, was surprised to see waterspouts, normally a tropical occurrence, gushing out of holes in the ice. They made the crossing just in time, as nine days later the river broke up and the ice went out.

The tracked trailers being used experimentally became a hazard, and the cause of delays. On every hill they had to be uncoupled and hauled up by cable. Even in smooth going they were hard to pull, compared to the sleds. As there was now only seven hours of darkness, melting continued all night. Col. Edwards, the senior U.S. observer, was to call the night of the 22nd a time of "extreme mechanical difficulties," and this was really an understatement. Six of the ten vehicles experienced mechanical problems: failures of oil pumps, wheels, transmissions, suspensions and thermostats. First breakdown was at 8 p.m. on

the 22nd, and the last at 8 a.m. on the 23rd. New parts were ordered, and efficiently delivered by 5 p.m. that afternoon.

Snowmobiles were now spread out over 50 miles, as the trail breakers had not suffered any breakdowns. An unexpected whammy now hit the men, riding bare-chested on top of the machines in the hot afternoons. Mosquitoes, described as “obviously wearing parkas at this latitude,” began to bite, and the insects were just as vicious as their cousins in the south. Overnight on the 23rd they made 60 miles, in spite of a delay in a swamp, and the usual transmission, wheel and overheating difficulties. They realized that the so-called “new” transmissions being supplied were actually old ones. The restoration and repair work done in the south was obviously the work of some shifty mechanic in the pay of the Russians or the Chinese, because the new ones had problems also.

By way of contrast, #8 vehicle was in excellent shape, and travelled for 64 hours without stopping on its trail breaking mission, and reached the Petitot River. It was a full day ahead of the others, who were very unhappy to see it raining, as the melting snow had already made for much mud. Two more transmissions broke down, and thermostat and wheel breakages were encountered, but four machines managed to keep running, and covered 36 miles to near the Muskeg River.

The five vehicles now comprising the 1st Division broke camp at 1:15 a.m. on the 25th, and found two feet of water lying on the ice of the Muskeg River. The first machine made it safely across, but dislodged the ice from the river bed, so the water level rose by six inches. The first vehicle that had made it over then rigged a cable, and pulled the rest across, with the crews wading beside their machines. Air ducts were closed, fan belts disconnected, and the combined power of the two machines, one towing and one moving, was just enough to offset the current.

The 2nd Division was running some five hours behind, and was delayed yet again with transmission troubles. Their radio was not working properly, but they took advantage of the halt to repair it. This was a lucky move, as the Commander passed information to them two hours later by radio as how to ford the Muskeg River. The towing methods worked well, and by midnight everyone was safely over the water.

Naval Lt. Jim Croal and his three helpers had left Norman Wells two weeks earlier, and used a glider to haul in an U.S. Army amphibious Weasel. Along the route, through 100 miles of bush, they had built corduroy roads across the swamps and bridges over the streams and rivers. This operation had been christened “Tadpole,” an appropriate name, as the work was largely done under water. The beavers, those busy Canadians, comprised most of the local population. Where they built dams, miniature lakes would be formed, blocking

the movement of land vehicles. Sometimes they were clever enough to wait until Croal and Company had constructed a bridge, then build a dam downstream to wash out the structure.

1st Division reached the Petitot River and found that trees had been cut by the “Tadpole” gang to provide a fascine bridge over the ice. Although they crossed without incident, the heavy load demolished part of the bridge, particularly at the ends. They noted that the river was rising, and some logs were floating away downstream. Meanwhile 2nd Division was falling even further behind, as their sleds were coming apart. Consequently, to lighten the loads material had to be pulled off and left on the road.

Just before the Petitot River there was a steep hill, and at the foot of the slope, 2nd Division found an overgrown puddle the size of an Olympic swimming pool. Sangster, who was leading, decided to make a run through the small lake, found the water up to his windshield, but managed to float ahead to dry land. The rest of the vehicles decided to wait for daylight to ford this water hazard. They made it, but now were faced with the Petitot and its pontoon bridge. The first three vehicles were able to cross, but while the final two were on the logs the whole thing began to move downstream. They were caught by cables and dragged the final 15 yards to shore.

They were elated at their success, and happy to be out of the Northwest Territories and into the province of British Columbia, but continued movement seemed a wiser course of action than sleeping. The temperature was up to 70°, so after a brief rest they were off to meet that final obstacle, the Fort Nelson River. Bridges over the small streams and swamps helped them along, and when they camped in the late evening, they were still 13 miles short of the Fort Nelson River. In 19 hours of travel they had managed to go 50 miles.

By noon on the 27th the entire Force was lined up waiting to cross the Fort Nelson River. The crew of #7 Vehicle was unhappy with their tracked trailer, so abandoned it. Everyone knew they had only 45 miles to go to the Fort Nelson Air Base, and considered just about anything expendable. Despite the previous orders about carrying broken parts out to Edmonton, spare tires and rations were dumped. Care was taken to remove the cigarettes and candy from the ration packs, and one day’s supply of food was retained. This prodigal action was to give them trouble later.

The river was about 300 yards wide, and near the far side there was a sand bar. Water was flowing at 5 to 6 mph, with miniature icebergs moving downstream. Occasional ice jams would dam the flow, and make the river deeper in places. The “Tadpole” crew set out in their Weasel to sound the bottom, and reported depths of six feet on the near side and nine feet on the far side. Suddenly the Weasel lost its engine power and began to drift downstream.

In a hurried rescue operation a line was thrown to the sailors, and they were pulled to shore.

The immediate plan was to try and tow the “snows” across, using the Weasel as a tug boat, and hopefully get additional help from an 18 ton bulldozer which had been ordered from Fort Nelson. The dozer could not find the trail, and got lost, but finally did show up on the 28th. After some consideration, this plan was discarded as unsafe, as to try and float a land vehicle for the 300 yards was too much of a gamble. No matter what system was used to make the crossing, the almost vertical bank on the far side was too steep for any machine to climb, unless some kind of slipway could be built.

The bulldozer appeared the next morning, and began to cut a path on the bank. Now the plan was to build a raft, with fifty empty gas drums used as the main platform. Everyone was set to cutting trees to use as bindings. As the drums had not yet been dropped, some crews had gained the impression that the raft was to be made of logs, and cut down large trees.

When the planes flew overhead and began dropping drums, the message became clear, and the raft was completed by mid-afternoon. Grease and parachutes were tucked into all the outside holes in the vehicles, in an attempt to make them waterproof, just in case the raft did not hold up.

In late afternoon the Weasel sailed to the sand bar and began to pull the snowmobiles across one by one, riding high on the raft. They lined up on the bar in battle formation, waiting for daylight to try the next move. The bulldozer finished building the approach slipway by 5 a.m. on the 29th, and then was able to complete the ferrying operation by 9:30.

The Alaska Highway was 24 miles ahead, so they were off immediately on what was thought would be the final day of difficult travel. The trail was hilly and muddy, and progress was slow. The second tracked trailer was abandoned, as were some sleds. Mud clogged the vehicle’s tracks, and many stops were required to clean off the mud, or build corduroy paths. The Weasel had been a real water baby, but when faced with gumbo it became completely immobilized. Its tracks, wheels and even axles had to be stripped off and cleaned before it could move.

By 6 p.m. they reached the gravel highway, and rejoiced to see cars whizzing by. Sangster noted: “it suddenly felt like landing into the middle of a traffic jam.” This was somewhat of an exaggeration, as in those days cars on the Highway were restricted, and only six permits were issued each day. Moving on, they reached Fort Nelson Base within an hour, where they crowded the bars, and made collect telephone calls home. This was the first contact they had been able to make with loved ones since Christmas of 1945.

At the end of March, Lt. Col. Don Cleghorn, who had been the Army Commandant at Churchill, moved to Edmonton to take charge of shipping any urgently needed supplies to the Force. He doubled as a public relations officer for Muskox to advise the press on its progress. In daily press conferences he reported on Force movements, and forecast the date when Edmonton would be reached. Every day there was a new projection, as the Force struggled with the elements and the wet terrain of the Northwest Territories.

The story on the 2nd of April was that everything was on schedule, but by the 9th they were going to be late. On the 17th the Force was three days behind its timetable, but this changed after the Liard River was crossed, and expectations soared. By the end of the month, when Fort Nelson was reached, there seemed to be no doubt that the original schedule would be met.

... Although the bars in the various Messes at Fort Nelsen beckoned the weary adventurers, there was an order banning libation. This came from the doctors of the Harvard Fatigue Laboratory, who had arrived to study the physical condition of the men, now that the trip was nearly over. The medics wanted an unsullied set of bodies, and men who would not stumble as they tried the famous 'step test.' The ruling brought on a near mutiny, so finally the doctors gave approval for a party, and they all joined in the fun.

The physicals were conducted the next day, and the troops' condition ruled to be just as good as when they departed from Churchill. Doug Sangster was to gain instant fame as a testee, as he had a permanent grid pattern etched into his rear extremity. This was the result of wearing a string vest pulled on over his rump for 2,700 miles. The admiring doctors took coloured photographs of the phenomenon, giving him the impression that he had made a real contribution to medical science.

Just prior to their crossing of the Fort Nelson River a track had broken on one of the vehicles. This was the first problem with the runners on the entire trip, and indicated that at least some parts had been made to last. But knowing that all the road ahead was gravel, the badly worn tracks were now replaced. Sleds were exchanged for tracked trailers, as supplies had to be hauled somehow. In the muddy going these trailers had not stood up, but the Force hoped they would run on the highway. The air intake filters had been removed on the shores of Hudson Bay, because they had not been required in the snow and cold of the Barren Lands. Unfortunately, no one thought to restore the filters, a mistake that would have an immediate effect on progress.

From Fort Nelson they had 700 miles to go, and only four days to do it by the schedule. It seemed quite possible, for at a top speed of 20 mph, 200 miles a day could be completed. Edmonton loomed but when they hit the road on May Day, top speed attained was only 11 mph, and dust had become a terrible

hazard, both inside and outside the “snows.” Cleats on the tracks dug up dust, threw it at the backs of the vehicles, where it fell directly into the rear-mounted air scoops. Once inside it passed quickly through to the cabs. Parachutes were cut in strips and made into protective face masks, various items wrapped around the scoops to reduce the grime, but all to no avail.

Once the dust got into the engines the old overheating problem was back. Cleats on the tracks became chipped and broken by the hard gravel, so repair stops were frequent. A 2nd Division vehicle was completely immobilized by a transmission defect, and fell six hours behind. Three machines blew out tires, using up the last spares. Oil got so dirty it had to be changed every few miles. They had started their trip at 9 a.m., and the 1st Division kept going in a rather erratic manner until 3 a.m. on May 2nd. Out of the 18 hours they had been on the road, four had been spent on repairs and servicing, but they did travel a record distance for any Exercise day - 159 miles.

It took 2nd Division 24 hours to cover the same distance as they had to take more than six hours of roadside time for repairs. Vehicle #8 had experienced oil pressure trouble, and a generator belt failure, and finally gave up the ghost and refused to move. It was towed to Trutch, a maintenance and refueling camp on the highway, where the engine was replaced.

Col. Wilson’s “natural enemy” (the weather) was to haunt them now, but in a diametrically opposite manner to that experienced in the early part of the trek. Clouds of dust hovered over the line of vehicles, like the pillars of sand which beset the Biblical war lords, or Lawrence of Arabia in the First World War, or General Montgomery’s Desert Rats in the more recent Second World War. Dust pervaded everything, so it was necessary to keep a half-mile interval between the machines so the drivers could see the road.

A number of ingenious solutions were tried to cut the pollution. Empty beer cans were salvaged from the ditches, filled with grass which had been saturated with oil, and fitted over the air intakes (there was much oil available as it had been changed every mile or so). Air filters were borrowed from trucks, and adapted to the snowmobiles. None of these remedies was fully successful, although some minor improvement was noted. They spent most of the 2nd camped and experimenting with anti-dust methods, and installing a new engine. 1st Division left at 4 p.m., but only managed 17 miles before another new engine was needed. The replacement made, they pushed on for another 13 miles before stopping to camp.

2nd Division did not leave until 7 p.m., but was able to move all night and reach Dawson Creek by noon the next day, covering 100 miles. They had also made an engine change, losing 6.5 hours of running time in the process. Arriving in Fort St. John at 6:30 a.m. they hoped to find a restaurant open

which would provide a hot breakfast, but no luck. Here they were met and interviewed by an enterprising team of a reporter and photographer from the *Toronto Star*.

1st Division set out at 8:30 on the morning of the 3rd, and after many stops was able to complete the 117 miles to Dawson Creek. They had spent the noon hour in Fort St. John, where they were entertained at a civic reception and lunch, sponsored by the patriotic citizens. On reaching Dawson Creek they found new evidence of the civilized world outside. They could pull into a filling station and mutter "Fill 'er up!" and then watch someone else pump 50 gallons into the fuel tank.

There was a barber shop in the town, and many decided it would be a good time to get rid of the 80-day beards. The enterprising barber, realizing that he was sitting on a gold mine, immediately raised the price of a shave to the exorbitant sum of 50 cents. The Mayor and Council had planned a lunch party for May 2nd, but as they were 36 hours late, it was converted to an evening affair. While the troops appreciated the effort, they all retired before midnight, anxious to move on and finish the job.

At 6 a.m. on the 4th, the Force was once more fighting the dust-laden air of the Highway. A new stunt was tried, in that skirts were built out of canvas and rigged over the rear of the vehicles on small poles. The theory was that this might hold down the dust, and prevent it getting into the engines, but the method did not work. Every ten miles oil had to be added, and every 20 miles both the oil and the filter changed. All the new and/or used engines in Canada had now been used, so when the next breakdown came, there could be no replacement. Vehicle #5 lost all compression so was loaded on a tank transporter and hauled south. At 1 p.m. the engine on #6 seized, so it had to be towed the rest of the way. In the late afternoon they entered Grand Prairie, blowing blue smoke rings as they moved into town.

The seven machines that were still mobile staged a parade down the main street of the town, and moved on to the RCAF Station at the airfield for the night. Deputy Director Wilson had come to greet them, and after a short period of soul-searching the decision was made to terminate the overland movement. Snowmobiles would be put on rail cars and shipped to Edmonton, before they all fell apart. Four days of travel in a dust bowl had made everyone willing to travel by an easier route. At the same time there was a sense of loss, all the problems they had faced together were at an end.

The 5th was a Sunday, and the day was spent loading the vehicles on the flat cars of a Northern Alberta Railway special train. All beards now came off, and the joke was that they could not recognize the clean-shaven men they were now encountering, who did not resemble the piratical crew they had been with

for the past four months. At 4:30 in the afternoon, the train pulled out and they were homeward bound via Edmonton.

After a 407 mile uneventful rail journey they reached the Edmonton rail yards at 7 a.m. The big treat was fresh milk to drink, although by a coincidence it was May 6th, the date that wartime beer rationing ended in Alberta. The five snowmobiles that could still run paraded through the downtown area in the afternoon, and then received an official welcome at the Prince of Wales armories from Lieutenant-Governor J.C. Bowen and General F.F. Worthington, Commander of Western Army Command.

During the next few days there was a round of parties, civic receptions, and dances for the new heroes. The press cut loose with exaggerated stories of their exploits, running long interviews with some of the American and British observers who had never managed to get north of Winnipeg or Edmonton. Following a week of leisure and lionization, they retired into the armories to take on the most difficult task of all - writing reports.

Chapter 12

LESSONS LEARNED AND LOST

Writing does not come easily to macho men, so the next few weeks spent in Edmonton preparing the reports were difficult. Notes had been taken on the move, and now had to be deciphered. Events long past had to be recalled, work methods and equipment appraised, and then all committed to paper. When finished, there was over 700 pages of print. Readership was to be limited, as everything was classified as either “SECRET” or “CONFIDENTIAL,” and none was downgraded to “UNCLASSIFIED” until 35 years later. The Army Report had a paradoxical note on the front page: “Not to be published.”

What was published was neatly printed on glossy paper, and ran for 138 pages, with another 30 pages of appendices. It was drafted in Edmonton and later edited in Ottawa during the summer, with the help of professional writers. Some of the [Public Relations] officers involved had obviously not been close to the Exercise, as there was a fair amount of contradictory information. For example, the summary of major conclusions listed seven which required further study, but went on to indicate that five of these had been resolved satisfactorily.

In a footnote relating to health, the statement was made that “exposure was very limited, as personnel were sheltered in the snowmobiles by day and heated tents by night.” Any members of the Moving Force who read this likely fell out of their chairs laughing, as they knew that shelter is a relative term. Other parts of the report were more exact. Appendix E pointed out that riding in the snowmobiles did cause 25% of the casualties, those due to monoxide poisoning. A critique on the tents suggested that a number of modifications were needed, and concluded that all troops destined for northern operations be trained to build igloos, as these gave better protection.

Prior to the exercise, the Medical Officers had thought that the major medical problems they would encounter would be snow blindness, trench foot, and frost bite. First aid and medical training and indoctrination given the troops targeted these hazards. No cases of trench foot or snow blindness occurred, and only twice was frost bite reported. The Moving Force casualty summary listed 72 cases, with the 18 monoxide poisoning by far the highest number. Next came cuts and abrasions (7), burns (6), common colds (5), headaches (4), with 20 other sicknesses which happened only once or twice.

The Churchill Base Force had a different list of complaints. In their summary the largest number of disabilities were psychiatric (15), and myositis, possibly traumatic (14), which would seem to indicate that men were really going nuts, or were faking mental problems to get themselves sent outside. There was a close relationship between the job and the illness at times, as fuel oil gave 13 cases of dermatitis, and dishwater another three. Some were upset by the food, with 11 cases of enteritis treated. Thirty-three other minor ailments were listed, along with four of VD, all of which had come in from the outside.

“Vehicles and Sleds” was the longest section in the Report, running for 28 pages. It criticized suspensions, steering, brakes, differentials, transmissions, and most of all, engines. Cooling, fuel, and exhaust systems were also censured, but electrical systems praised. Heaters were described as unsatisfactory, instruments inaccurate, and cabs poorly designed.

All these deficiencies led to a long list of recommendations. Eight essentials were listed for any military over-snow vehicle, and 15 modifications to the present machine outlined. As a short term policy, better cooling and air cleaning systems were suggested, plus an improved cab, steering mechanism, generator and suspension. The proposal for a whole new snowmobile suggested a number of advancements that the auto industry was to adopt in future years. The Army engineers came up with a list of “extras” not on 1946 cars - power steering, automatic transmissions, independently sprung wheels with shock absorbers, tinted and heated windshields and an inside efficient heater.

‘Scientific Observations’ made up the last half of the Report. Items covered were topography and flora in a combined section, and individual chapters dealing with fauna, geology, ice, snow, navigation, and meteorology. Topography/flora described the terrain and vegetation found along the route, with the land elevation included where it had been calculated, or obtained from visiting aircrews. The main conclusion was that the maps were not accurate on height of land or anything else. Of interest [regarding] fauna was the fact that none existed from a point 50 miles north of Churchill, and none was seen again until the Force reached the Dismal Lakes, where moss, lichen and grass became visible.

Fauna was shown as either mammals or birds. Most of the animals, 22 varieties in all, were observed in the eastern Arctic; while the majority of the 37 kinds of birds were in the west. This was to be expected, as northward migration had begun when the Force moved south of Great Bear Lake. It was found that some birds spend the entire winter in the Arctic. Nine different species were seen in the Churchill - Baker Lake area during the first three months of the year, in spite of temperatures well below zero. The list included American Goshawk,

Spruce Grouse, Willow and Rock Ptarmigan, Canada Jay, Brown Headed Chickadee and Snow Bunting.

The RCAF report was typed and mimeographed on 81 by 14 inch paper, and covered 19 topics in 84 pages. It was originally labelled "Interim," but the Headquarters staff had no wish to be involved, so crossed out the word, and inserted "Final" in its place. Page 2 was an impressive list of 21 statistics, listing such items as:

Total weight of cargo carried - 838,220 pounds

Number of passengers carried - 1,155

Passenger miles flown - 2,683,123

Daily weight of supplies dropped - 4,789 pounds

Norseman serviceability 87%, and Dakota serviceability 80%

This was commendable for an outfit that only had six cargo carrying airplanes.

Aircrews were given most of the praise, something the ground crews had come to expect. However, many items dealt with prosaic matters - accounting, clothing, radios, navigation instruments, snow blowers and earth moving machines. As accounts were handled by the staff at Rockcliffe airport, Ottawa, delays in time and distance were normal. Delays on moves and expense accounts often ran for three months. Selling gasoline to the USAAF was made difficult as each time "12 copies of an E.26 had to be raised."

The section on discipline noted that the most common breach of rules at southern RCAF Stations, now that the war was over, was absence without leave. On Muskox, this violation of regulations did not occur. Apparently none of the men were willing to take a chance on joining up with the Eskimo tribes. The longest section in the report dealt with "organization," which included the usual organization charts so dear to RCAF hearts, plus a roster giving the duties and responsibilities of everyone. It was explained that this organization did not always work, due to the difficulties of operating at great distance from the next echelon up the administration ladder.

80% of the section on ground crew matters was devoted to criticism of the Army issue clothing - parkas, mukluks, trigger mitts, insoles and socks. None could withstand the rigors relating to servicing aircraft in the north, as they were not oil resistant, and quickly tore or plain wore out. The suggestion was that Eskimo clothing be studied, and native patterns and materials adopted for RCAF use. The Army made this same point.

The navigators felt that the six different types of compasses they used were okay, as were gyros and other instruments, except all were hard to keep in operation in the extreme cold. Map reading was virtually impossible in the eastern Arctic, as maps could not be trusted. When landmarks did exist, they

could not be identified due to the lack of trees, and the high incidence of blowing snow.

The Air Force next put on an act reminiscent of Academy Award night. Two pages were devoted to thanking everyone even remotely involved in the Exercise. First came the Army, in particular the Army Liaison Officer attached to the ASU, then the DOT, RCMP and a group which really had not contributed - the foreign observers from the U.K., U.S.A., U.S.S.R., France, Belgium, Norway, Peru, and Chile. Next came the Hudson's Bay Company factors, the mine managers at Port Radium and Yellowknife, and the Esso boss at Norman Wells.

The paean of praise included the natives, recognizing that they were friendly and industrious, intelligent and always willing to co-operate. It was not included in the report, but the RCAF had found that the Eskimos always returned any parachutes they found, unlike the white folk, who tended to keep the still rare nylon. Somehow the clergy was left off the list of credits, although they had contributed at many northern airfields. There was a brief mention of the native Indians, to the effect that "very few were encountered" and their relationship to the RCAF left in limbo.

The Meteorological Report echoed that of the RCAF in that it was mimeographed on foolscap paper, first marked "Interim," and later made "Final." It had 56 pages of text, with 63 appendices which gave weather statistics. It was written by a committee of ten, so was omnifarious or hydra-headed. To demonstrate that anything can be done with data, the meteorologists were able to prove that their forecasts were 78 to 85 percent correct. Yet they were working in a region where basic information was totally lacking, and had none of the modern day computers or satellite pictures.

When they summarized what they had learned, the weathermen could find only one positive benefit. Radio teletype, as used at Norman Wells and Yellowknife for the first time anywhere in the Arctic, was highly satisfactory. Eight negative items were listed: lack of organization in their own outfit, Army ignorance on the use of weather services, poor reporting, poor communications to Churchill, inadequate instruments, poor staff training, and a general lack of scientific knowledge of the Arctic.

The report by the U.S. Military Observers was the longest of the lot, and provided the most detail. Its 310 pages included an excellent map of the route, and a daily diary of the Moving Force activities. Not all material was original, as about half (149 pages) was borrowed from the Canadian Army Report. There were interesting comments on American-Canadian relationships, indicating national differences. The Yanks felt their supplies and equipment were superior in every way, and could not understand why the dumb Canadians did not

accept them and use them. According to the report, once the Canucks tried these items, they were enchanted. Not quite true; such things as gliders, cargo sleds, and some dry rations were rejected as of no value by the Canadians.

Col. Norman Edwards, the senior American observer, noted that his hosts were offended by press reports which implied that the exercise was an American operation. He indicated that much tact and consideration had to be shown by the members of his team to cool down the insulted Canadians. Edwards went so far as to discuss this national pride shown by the northern neighbours with the U.S. Ambassador to Canada, and the two men agreed on a statement in the report. It read: "Canada does not want the United States to regard her northland as an unrestricted testing ground for the United States Armed Forces instead of a land over which she exercises complete sovereignty."

The U.S. report concluded with five recommendations. The first two dealt with the need for peacetime Arctic training and for more joint exercises. The third was that clothing be provided to keep the (U.S.) soldier "as comfortable as is the Eskimo in his native furs." The fourth wisely suggested that a new over-snow vehicle be designed "from scratch." Finally, in spite of the observers' awareness of how sensitive Canadians were about their national identity, it was recommended that the U.S. Department of Defence establish a winter testing site at Churchill, Manitoba. Shades of the 1988 free trade debate!¹²

What did it all cost? This was raised in the House of Commons about a year later. On February 6th, 1947, Mr. Tustin, the member for Prince Edward-

¹² *Editors' note:* Both the Canadians and Americans agreed that the technical services required a space where they could test equipment in Arctic conditions, and planners decided upon Churchill, Manitoba, which was surrounded by a barren landscape and accessible year round by plane and rail. It boasted ideal terrain and climate to mimic the arctic conditions in which the army would have to operate. To the north of the town was the tundra of the Arctic, while to its south lay the kind of wooded areas troops would have to operate in if deployed to the Subarctic. The Joint Experimental Testing Station focused on land operations, with Canadian and American personnel conducting independent experiments until 1950-1951. Exercise *Musk Ox* provided them with a long list of problems to address. The first couple of winters were spent seeing if soldiers could live for long periods in the Arctic and if their equipment could withstand the cold.

These studies highlighted that in the Arctic the soldier needed almost 90% of his time just to stay alive and could devote only 10% to fighting. A main goal of the staff at Fort Churchill was to even out these percentages by improving clothing and equipment. See

¹² The Combined Experimental and Training Station, Fort Churchill, DHH 91/171; An Introduction to Churchill and Surrounding Area, by 7099th ASU, NARA, RG 156, Entry 646-A, Box A764; and Andrew Iarocci, "Opening the North: Technology and Training at the Fort Churchill Joint Services Experimental Testing Station, 1946-64," *Canadian Army Journal* 10/4 (Winter 2008): 74-95.

Lennox, asked: "What was the total cost, including salaries and equipment, of the Muskox Expedition?" He was given only half of the answer. "Insofar as the Department of National Defence (Air) is concerned: \$273,895.85."

Mr. Tustin was apparently not aware that the Army had participated in the Exercise, as he did not ask any supplementary question. If given the chance, politicians can always cut costs verbally. The figure provided was likely less than half the real cost, but when it is applied to the 838,220 pounds the Air Force delivered, it cost 32 cents a pound to transfer material to the far north. This is worth considering in a time when it costs 38 cents to have a local post card delivered.

Further Readings

- Baird, Patrick. "MuskOx Retold." *North* 25, no.5, (September/October 1978): 24-44.
- Bercuson, David J. "Continental Defense and Arctic Security, 1945-50: Solving the Canadian Dilemma." in *The Cold War and Defense* ed. K. Neilson and R.G. Haycock (New York: Praeger, 1990): 153-70.
- Coates, Ken, Whitney Lackenbauer, William Morrison and Greg Poelzer. *Arctic Front: Defending Canada's Interests in the Far North*. Toronto: Thomas Allen, 2008.
- Eyre, Kenneth C. "Custos Borealis: The Military in the Canadian North." Unpublished Ph.D. thesis, University of London - King's College, 1981.
- Eyre, Kenneth C. "Forty Years of Military Activity in the Canadian North, 1947-87." *Arctic* 40, no.4 (December 1987): 292-99.
- Eyre, Major K.C. "Tactics in the Snow: The Development of a Concept." *Canadian Defence Quarterly* 4, no.4 (Spring 1975), 7-12.
- Farish, Matthew. "Frontier Engineering: From the Globe to the Body in the Cold War Arctic." *The Canadian Geographer* 50, no.2 (2006): 177-196.
- Goodspeed, D.J. *A History of the Defence Research Board of Canada*. Ottawa: Defence Research Board, 1958.
- Grant, Shelagh. *Polar Imperative*. Vancouver: Douglas and McIntyre, 2010.
- Grant, Shelagh. *Sovereignty or Security?: Government Policy in the Canadian North, 1936-1950*. Vancouver: University of British Columbia Press, 1988.
- Halliday, Hugh. "Exercise 'Musk Ox': Asserting Sovereignty 'North of 60.'" *Canadian Military History* 7, no. 4 (2012): 37-44.
- Halliday, Hugh. "Recapturing the North: Exercises 'Eskimo,' 'Polar Bear' and 'Lemming' 1945." *Canadian Military History* 6, no.2 (Autumn 1997), 29-38.
- Horn, LCol Bernd. "Gateway to Invasion or the Curse of Geography? The Canadian Arctic and the Question of Security, 1939-1999." In *Forging a Nation: Perspectives on the Canadian Military Experience*, ed. B. Horn. St. Catharines: Vanwell, 2002. 307-334.

- Kikkert, Peter. "Pragmatism and Cooperation: Canadian-American Defence Activities in the Arctic, 1945-1951." Unpublished M.A. thesis, University of Waterloo, 2009.
- Lackenbauer, P. Whitney, ed. *Canada and Arctic Sovereignty and Security: Historical Perspectives*. Calgary: Centre for Military and Strategic Studies, 2011.
- Lackenbauer, P. Whitney. "Right and Honourable: Mackenzie King, Canadian-American Bilateral Relations, and Canadian Sovereignty in the Northwest, 1943-1948." in *Mackenzie King: Citizenship and Community* eds. J. English et al. Toronto: Robin Brass Studios, 2002: 151-68.
- Lackenbauer, P. Whitney and Matthew Farish. "The Cold War on Canadian Soil: Militarizing a Northern Environment." *Environmental History* 12, no. 3 (2007): 920-50.
- Rowley, G.W. "Exercise Muskox." *Geographical Journal* 109, no. 4/6 (1947): 175-184.
- Sutherland, R.J. "The Strategic Significance of the Canadian Arctic." In *The Arctic Frontier*. Edited by R. St. J. MacDonald. Toronto: University of Toronto Press, 1966. 256-78.
- Tedlie, Alfred James. "'Winter and Rough Weather' Fort Churchill 1946-1964 in Defence of Canada." Unpublished M.A. thesis, University of Victoria, 1989.
- Thrasher, Kevin Mendel. "Exercise Musk Ox: Lost Opportunities." Unpublished M.A. thesis, Carleton University, 1998.
- Wilson, J. Tuzo. "Exercise Musk-Ox, 1946." *Polar Record* 5, no.33 (December 1947): 14-27.
- Wilson, J. Tuzo. "Winter Manoeuvres in Canada." *Canadian Geographical Journal*, 32-33 (1946): 88-93.

About the Editors

P. WHITNEY LACKENBAUER, Ph.D., is Canada Research Chair in the Study of the Canadian North and professor in the School of Canadian Studies at Trent University. He is also co-director of the Centre on Foreign Policy and Federalism at St. Jerome's University (University of Waterloo); adjunct professor at the Mulroney Institute on Government at St. Francis-Xavier University; and the Honorary Lieutenant Colonel of 1st Canadian Ranger Patrol Group (1CRPG) based in Yellowknife. His recent books include *China's Arctic Ambitions and What They Mean for Canada* (co-authored 2018); *The Networked North* (co-edited 2017); *Canadian Armed Forces Arctic Operations, 1945-2015: Historical and Contemporary Lessons Learned* (co-edited 2017); and *Whole of Government through an Arctic Lens* (co-edited 2017).



PETER KIKKERT, Ph.D., is Irving Shipbuilding Chair in Arctic Policy at St. Francis Xavier University. His dissertation, "Grasping for the Ends of the Earth: Framing and Contesting Polar Sovereignty, 1900-1955," explored the evolution of sovereignty and the legal principles for the acquisition of territory in an international, bi-polar context. He has co-edited *The Canadian Forces and Arctic Sovereignty: Debating Roles, Interests, and Requirements, 1968-1974* and *Legal Appraisals of Canada's Arctic Sovereignty: Key Documents, 1905-56*. Other publications include articles on the sector principle, Canada's Arctic sovereignty strategy in the early Cold War, and Yukon during the First World War.



Tracks North: The Story of Exercise Musk Ox

Between February and May 1946, the Canadian military tested its ability to move a small force across the Arctic in Exercise *Musk Ox* – an epic 3200-mile journey from Churchill, north to Cambridge Bay, and then back south to Edmonton, through unmapped territory, blizzards, spring floods, mud and dust storms. The exercise represented the first attempt to use motorized land vehicles to traverse Canada's High Arctic and it required the largest aerial resupply effort ever attempted in the country up to that point. In *Tracks North: The Story of Exercise Muskox*, John Lauder – who served as a meteorologist at Churchill and Norman Wells during the exercise – narrates the endeavour from the extensive planning and preparation it required, to the preliminary winter training undertaken by the expedition members, their long journey through the North, and the massive amount of logistical support required by the small moving force. In telling the story of Exercise *Musk Ox*, Lauder captures the challenges experienced at every stage of the exercise – and the improvisation and innovation required to overcome them.



ST. FRANCIS XAVIER
UNIVERSITY

MULRONEY INSTITUTE
OF GOVERNMENT