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The Development of Cold War Soldierly

Acclimatisation Research and Military Indoctrination in the Canadian Arctic, 1947–1953

MATTHEW S. WISEMAN

Abstract: Between 1947 and 1953, leading scientists at Canada's Defence Research Board (DRB) administered physiological and psychological experiments on soldiers conducting indoctrination training for Arctic warfare. Designed in an attempt to determine the ideal characteristics of cold-weather soldiery, one experiment resulted in physical and mental injury to two participating troops. Although the army immediately questioned its participation in further DRB testing because of the sustained injuries, ethical issues of human testing seemed not to deeply penetrate military and defence discourse concerning the involvement of troops in acclimatisation research and indoctrination training. This article examines cold-weather human testing to argue that the development of Cold War soldiery in Canada conformed to superficial gender ideals about virile masculinity in the early postwar period.

“Great physical and mental effort is required under conditions of extreme cold and high windchill to remain aggressive. The cold and unusual conditions of life can, if allowed, impose a heavy strain on morale. Every opportunity must be taken to seek out and destroy the

enemy in order to increase the strain on the enemy, to deprive him of rest and time to prepare food, and eventually destroy him.”¹

DURING THE EARLY Cold War period, the Canadian Arctic became a training ground for Western forces. Together with American and British counterparts, Canadian troops took part in a series of military exercises, designed to prepare both men and equipment for cold-weather warfare.² Each exercise aimed specifically to determine infantry requirements as well as the tactical techniques and coordination methods required for military operations in extremely cold winter conditions. The most well-known exercise remains the three-month northern excursion named Operation Musk Ox, which combined Canada-United States military support and reinforced notions that the Canadian Arctic represented the first line of defence against a potential attack on North America.³ Less well-known but also important to the Canadian military and defence establishment was Sun Dog One, a one-month exercise carried out in an effort to deduce and overcome environmental challenges unique to Arctic military operations.

Sun Dog One served a scientific as well as military purpose. During the exercise, scientists of Canada’s Defence Research Board

¹ As quoted in the final report of Sun Dog One, prepared under the direction of the Chief of General Staff and published by the Directorate of Military Training; see Winter Exercise “Sun Dog One,” RG 24, Volume 4206, File 270-0-89-6, Library and Archives Canada (LAC), 12.

² The Canadian military participated in no fewer than twenty-two northern operations in the first decade of the Cold War, including exercises “Eskimo,” “Polar Bear,” and “Lemming” (1945); “Musk Ox” (1946); “Moccasin” (1947–1948); “Sigloo” (1948–1949); “Cross Country,” “Sweetbriar,” “Sun Dog One,” and “Shoo Fly One” (1950); “Sun Dog Two,” “Shoo Fly Two,” “Measureall,” and “Pole Star One, Two and Three” (1951–1952); “Sun Dog Three,” “Deer Fly One, Two and Three,” and “Prairie Tundra One” (1952); “Prairie Tundra Two” (1952–1953); and “Bull Dog” (1953); see C.E. Law, J.A. Easterbrook, and M.F. Coffey, Defence Research Board Northern Laboratory: Progress Report on an Assessment of Current Equipment and Methods used by Army Personnel for Ground Navigation in the North, 30 June 1954, RG 85, Volume 299, File 1009-2[5], LAC. For an abbreviated list of Canadian army exercises in the North between 1945 and 1953, including dates, locations, and aims, see Andrew B. Godefroy, *In Peace Prepared: Innovation and Adaptation in Canada’s Cold War Army* (Vancouver: University of British Columbia Press, 2014), 87–88.

³ See Reg Whitaker and Gary Marcuse, *Cold War Canada: The Making of a National Insecurity State, 1945–1957* (Toronto: University of Toronto Press, 1994), 141–142 and Robert Teigrob, *Warming up to the Cold War: Canada and the United States’ Coalition of the Willing, from Hiroshima to Korea* (Toronto: University of Toronto Press, 2009), 64–65.

(DRB) observed trials of Canadian, American, and British cold-weather clothing and equipment. Scientists from the DRB also conducted experimental trials on participating troops as part of an acclimatisation and indoctrination programme that aimed to determine the physical and psychological requirements of cold-weather soldiery. Symptomatic of broader Cold War desires to understand and overcome the natural environment, indoctrination training in the Canadian Arctic served to regulate anxieties of inadequacy and perpetuate seemingly false notions of control and power amongst planners, observers, and participants. Although training proved effective and educational, the lessons learned came at a cost. Scientists deemed some troops physically or temperamentally weak for cold-weather operations and thus less favourable for Arctic service than men whose physical and mental attributes posed no apparent or potential detriment to the morale and effectiveness of the other participating troops.

Neither Sun Dog One nor the cold-weather research conducted on participating troops was vital to the continental defence of North America, but both provide important insights for considering the role and structure of Canada's postwar military. According to the existing literature, the defence of Canada in the nuclear age depended primarily on a fully integrated air system that included radar and jet interceptors.⁴ Canada embraced a middle power philosophy and bolstered its national security through multilateral and bilateral agreements. In the process, the Canadian military underwent massive reductions in operating budget and personnel strength. Defence against an increasingly hostile Soviet Union depended on international cooperation rather than independent professional standing forces. Yet Canada's defence establishment funded scientific work to investigate human performance under military training in severe cold. DRB science conducted in collaboration with the military suggests that defence officials were open to the possibility that Arctic defence might include a well-trained land element. The science speaks to postwar gender ideals as well. Officials equated adequate performance in severe cold with virile notions of masculinity. To be

⁴ See for example, by date of publication, Joseph T. Jockel, *No Boundaries Upstairs: Canada, the United States, and the Origins of North American Air Defence, 1945-1958* (Vancouver: University of British Columbia Press, 1987); Robert Bothwell, *The Big Chill: Canada and the Cold War* (Toronto: Canadian Institute of International Affairs, 1998); and Sean M. Maloney, *Learning to Love the Bomb: Canada's Nuclear Weapons During the Cold War* (Washington: Potomac, 2007).

a Cold War Arctic soldier meant not only survival in but also the defeat of Canada's most harsh environmental elements.

Historians have only recently begun to uncover the depth of Canada's Cold War scientific activity, but recent research shows the complex integration between the Canadian national defence establishment and military.⁵ Whitney Lackenbauer and Matthew Farish have argued that postwar Western military interest in the Canadian Arctic signalled not only "the systematic consolidation of nature as military entity, but also an extension of the scope and terms of militarization to reflect the cautious longevity of the Cold War."⁶ Situating the postwar northern military exercise in a broader environmental discourse, Lackenbauer and Farish explore the pervasive legacy of Cold War militarism in Canada in a manner that moves beyond the more traditional diplomatic or social analyses of the period.⁷ This article also examines the pervasive legacy of Cold War militarism, but highlights human as well as environmental aspects. Although Canada's northern climate and geography significantly shaped defence policy in the early postwar years, military preparedness was also a direct corollary of defence science.

Cold-weather human testing represents an interesting aspect of military preparedness, but as a topic remains largely unexplored by historians. This article examines the connection between military indoctrination and scientific cold-weather acclimatisation research in an effort to contextualise an important aspect of Canada's Cold War

⁵ Two significant contributions to the field of Canada's Cold War defence-related science include, Andrew B. Godefroy, *Defence and Discovery: Canada's Military Space Program, 1945-74* (Vancouver: University of British Columbia Press, 2011); and Donald Avery, *Pathogens for War: Biological Weapons, Canadian Life Scientists, and North American Biodefence* (Toronto: University of Toronto Press, 2013).

⁶ P. Whitney Lackenbauer and Matthew Farish, "The Cold War on Canadian Soil: Militarizing a Northern Environment," *Environmental History* 12, no. 4 Special Issue on Canada (2007), 920-950.

⁷ Some other foundational works on Cold War Canada include, by date of publication, Whitaker and Marcuse, *Cold War Canada* (1994); Greg Donaghy, ed., *Canada and the Early Cold War, 1943-1957* (Ottawa: Department of Foreign Affairs and International Trade, 1998); Andrew Burtch, *Give Me Shelter: The Failure of Canada's Cold War Civil Defence* (Vancouver: University of British Columbia Press, 2012); Tarah Brookfield, *Cold War Comforts: Canadian Women, Child Safety, and Global Insecurity, 1945-1975* (Waterloo: Wilfrid Laurier University Press, 2012); Isabel Campbell, *Unlikely Diplomats: The Canadian Brigade in Germany, 1951-64* (Vancouver: University of British Columbia Press, 2013); and Godefroy, *In Peace Prepared* (2014).



Canadian parachute-qualified personnel who will be posted to the 1st Canadian Parachute Battalion undertaking winter infantry training at A-35 Canadian Parachute Training Centre (Canadian Army Training Centres and Schools), Camp Shilo, Manitoba, Canada, 20 March 1945. [Capt. Frank Royal / Canada. Dept. of National Defence / Library and Archives Canada / PA-209726]

legacy while also contributing to a growing international literature on human and environmental science in the early postwar period. Sun Dog One represents an ideal case study. During the exercise, scientists tested the physical and mental qualities of troops operating under severe cold-weather conditions. The experiments were part of an Arctic acclimatisation research and indoctrination training programme, initiated to isolate the ideal male characteristics of cold-weather soldiery. In turn, Canada's defence and military establishment attempted to develop a process to isolate men deemed physically and mentally valuable to support a northern defence. Sun Dog One consequently provides a unique window into the development and impact of Cold War soldiery, an intriguing topic about military masculinity that provides many insights for Canadian historians and raises important questions about the ethics of human testing and defence science in the years immediately following the Second World War.

SEEDS OF ARCTIC INTEREST

Interest in the Arctic increased dramatically during the Second World War with the Japanese invasion of the Aleutian Islands, the establishment of British and Soviet east-west routes for the transport of aircraft, and a series of massive construction projects initiated by the United States. North American continental defences began to take shape accordingly, as Washington funded the construction of extensive infrastructure and facilities to service “isolated” areas including the Alaska Highway, airfields to support aircraft service to Alaska, over fifty weather stations, and an oil distribution system between Yukon and the Northwest Territories named the Canol Project. The United States also acquired a lease to an air base at Goose Bay, Labrador, to serve as a location from which the air force could potentially bomb the Soviet Union and see its aircraft return.⁸ At the same time, the Canadian government agreed to co-finance the construction of early warning radar systems with the United States. Within six years of 1949, contracts stipulated the construction of the Pinetree Line, the Mid-Canada Line, and the Distant Early Warning (DEW) Line.⁹

During the 1940s, a proliferation occurred in maps oriented over the North Pole.¹⁰ Air-age globalism revealed the surprisingly close geographic proximity of the Soviet Union, and North American territory emerged expansive and vulnerable at the top. In the process, the Arctic became a frontier space of both strategic and scientific importance, an ideal laboratory for intellectual pursuit that had implications of a local and global significance. The American military embraced this logic and approached the North as a vital component of continental defence but also as one of many hostile environments to overcome. The situation led to an expansive and highly entangled relationship between military and scientific affiliations, as historians

⁸ Peter Kasurak, *A National Force: The Evolution of Canada's Army, 1950–2000* (Vancouver: University of British Columbia Press, 2013), 11.

⁹ For a detailed timeline of North American air defence cooperation between Canada and the United States with regard to radar, see Daniel Heidt and P. Whitney Lackenbauer, “Sovereignty for Hire: Civilian Airlift Contractors and the Distant Early Warning (DEW) Line, 1954–1961,” in P. Whitney Lackenbauer, *Deciding required!: the historical dimension of the Canadian Air Force's experience in the Arctic* (Ottawa: National Defence and the Canadian Forces, 2012), 95–112.

¹⁰ Matthew Farish, *The Contours of America's Cold War* (Minneapolis: University of Minnesota, 2010), 174.

of science and the Cold War have shown.¹¹ As Matthew Farish explains in an intricate study of American knowledge production, “the Arctic frontier was *engineered*—not just in the sense of specific landscapes and bodies as sites for technical manipulation and control but also according to more general principles of development, order, and appropriation for scientific and strategic needs.”¹² Coupled with the growing tensions between the East and West, the Arctic, as both an idea and physical space, was ripe for a high-anxiety postwar “assault.”

Although the terms sovereignty and defence may seem interchangeable, in the context of the postwar security environment Canada faced two distinct threats. As fears of a Soviet attack grew, research teams, administrators, and troops pushed northward to study and occupy the largely “unknown” region. Collectively, on behalf of the Canadian government, these individuals worked to defend the North against Soviet aggression while also promoting territorial sovereignty in the midst of increasing encroachment from the United States. There was certainly mutual agreement in both Ottawa and Washington that precautions were necessary to protect the North American continent, but at the same time officials in Canada showed concern for the rapid increase of American activity north of the border. As noted by Rob Huebert, concerns worsened periodically in Canada when various American officials mused about the possibility of “taking control” of Canadian territory to prepare their own defences against the Soviet threat.¹³ Yet Canada was not in a position to provide the necessary resources required of a modern and effective national defence. In spite of the emerging concerns about American encroachment, Canada had little choice but to collaborate closely with its southern neighbour in defence of the North American continent.

While the nuances of early Cold War defence relations between Canada and the United States require further attention, the current body of literature seems to agree that the Americans respected Canadian claims to territorial sovereignty in the North. Rather than annex parts of the seemingly remote and ignored Canadian Arctic,

¹¹ Ronald E. Doel, “Constituting the Postwar Earth Sciences: The Military’s Influence on the Environmental Sciences in the USA after 1945,” *Social Studies of Science* 33, no. 5 (2003), 635–666.

¹² Farish, *The Contours of America’s Cold War*, 176.

¹³ Rob Huebert, “Walking and Talking Independence in the Canadian North,” in *An Independent Foreign Policy for Canada? Challenges and Choices for the Future*, Brian Bow and Patrick Lennox, eds. (Toronto: University of Toronto Press, 2008), 119.

Washington desired to work in collaboration with Ottawa to establish the adequate defence system that officials in both cities deemed necessary. In many ways, the situation proved quite advantageous for Canada. The government gained access to the physical and financial resources of United States and simultaneously bolstered its defensive position against the Soviet Union. Scholars debate whether Canada sacrificed its sovereignty in the process, but diplomatic negotiations resulted in bilateral arrangements with real and lasting benefits to both Canada and the United States.¹⁴

CANADA'S POSTWAR MILITARY

The Canadian army emerged from the Second World War lacking a large staff that could focus on national military strategy. During the early postwar period, the office of the science advisor to the chief of the general staff at Army Headquarters only had a small civilian analytical component. While a few senior Defence Research Board (DRB) officials were part of the headquarters, the professional staff of the Canadian Army Operations Research Establishment never exceeded fifteen personnel. As argued by Peter Kasurak, these circumstances proved a significant shortcoming in the directive of Army Headquarters as it faced the challenges of the emerging Soviet threat.¹⁵ Nevertheless, the Canadian government authorised the creation of an air transportable brigade known as the Mobile Reserve. Comprised of three infantry battalions with combat support and service support units, the brigade was renamed the Mobile Striking Force (MSF) in 1948. Officials designed the MSF as a preventative land element that would deter the Soviets from establishing forward

¹⁴ Shelagh Grant has suggested that Canada sacrificed its sovereignty in Arctic defence negotiations with the United States; see *Sovereignty or Security: Government Policy in the Canadian North, 1936-1950* (Vancouver: University of British Columbia Press, 1988). Others have emphasised sound decision-making, open dialogue, and respect on both sides. See P. Whitney Lackenbauer and Peter Kikkert, "Sovereignty and Security: Canadian Diplomacy, the United States, and the Arctic, 1943-1968," in *In the National Interest: Canadian Foreign Policy and the Department of Foreign Affairs and International Trade*, Greg Donaghy and Michael K. Carroll, eds. (Calgary: University of Calgary Press, 2011), 101-120.

¹⁵ Kasurak, *A National Force*, 16.

operating bases in the Canadian North.¹⁶ At the time, technology restricted long-range bombers from making roundtrip flights over the North Pole. Continental defence, therefore, depended on the ability of the MSF to prevent the Soviets from establishing re-fueling service stations on North American territory. The MSF also served to promote Canadian claims to territorial sovereignty by facilitating operational cooperation with United States forces.

Although the MSF bolstered the presence of the Canadian military in the North, scholars tend to agree that the postwar land element served only a partial role in the defence of the North American continent. This assessment finds support in the personal convictions of Canada's Minister of National Defence Brooke Claxton. Unconvinced that the Soviets posed a direct threat against the Canadian North, Claxton never spent more resources on ground defences than was politically necessary. He provided the minimum support required to sustain the MSF and restricted military funds elsewhere. Under his authority, the Canadian army did not figure prominently in either foreign or domestic policy.¹⁷

During the early postwar period, Ottawa embraced a middle power philosophy and sought to secure Canadian sovereignty at home and abroad through involvement in international partnerships such as the North Atlantic Treaty Organisation (NATO), North American Air Defence Command (NORAD), and the United Nations (UN). Multilateral and increasingly bilateral agreements provided the backbone of Canadian defence. The military underwent a drastic reduction as a result, and the Mackenzie King government reallocated federal finances toward other national priorities that included veterans' benefits, family allowances and other social-welfare programs.¹⁸ Within two years of the end of the Second World War, the army reduced in personnel strength from 478,090 to only 15,852.¹⁹

¹⁶ For information on the MSF, see Sean M. Maloney, "The Mobile Striking Force and Continental Defence 1948-1955," *Canadian Military Journal* 2, no. 2 (1993), 75-88; Bernd Horn, *Bastard Sons: An Examination of Canada's Airborne Experience 1941-1995* (St. Catherines: Vanwell Publishing Limited, 2001); and Raymond Stouffer, "Military Culture and the Mobile Striking Force" in P. Whitney Lackenbauer, *De-icing required!*, 58-70.

¹⁷ See for example, Colonel Bernd Horn, ed., *The Canadian War of War: Serving the National Interest* (Toronto: Dundurn, 2006); and Kasurak, *A National Force*.

¹⁸ For an assessment of the impact that federal finance reallocation had on the postwar Canadian military, see Andrew Godefroy, *In Peace Prepared*.

¹⁹ Kasurak, *A National Force*, 11.

As an instrument of national power, the Canadian military suffered from a lack of coherent and durable political guidance and became both fragmented and disjointed.²⁰ While American and Canadian scientific and defensive interests largely coincided in the period, government officials in Ottawa supported research of a non-strategic orientation. Hugh Keenleyside, for instance, shared with Minister of Foreign Affairs Lester Pearson the view that Canada should support resources and research over strategy and politics.²¹ As deputy minister of mines and resources, commissioner of the Northwest Territories, and chairman of the Arctic Research Advisory Committee of the DRB, Keenleyside was a high-ranking official with a significant level of influence on northern affairs and finance spending. He received an informal education on the Canadian North and its indigenous populations from Arctic geographers such as Vilhjalmur Stefansson, Erling Porslid, and Trevor Lloyd, and used his position in government to promote the spread of “industrial civilization” northward.²² Defence considerations in the North were lower on his agenda than the work of scientists, explorers, administrators, educators, doctors, and social workers.²³ He participated in the creation and subsequent activities of the Arctic Institute of North America, and supported the DRB as modern scientific establishment.

In spite of rapid demobilisation and cost cutting, the Canadian military maintained a notable contribution to national security in the immediate postwar years. As argued by Andrew Godefroy, “[that] the postwar Canadian Army was ultimately capable of innovating and adapting to meet new threats alongside its two main allies under such conditions suggests that a great deal of military enterprise and innovation occurred within the institution.”²⁴ Godefroy does not suggest that all changes to postwar military structure were novel and successful, but he nonetheless maintains that historical scholarship is too critical of the Canadian military during the early Cold War period.

²⁰ Howard G. Coombs and Richard Goette, “Supporting the Pax Americana: Canada’s Military and the Cold War,” in Colonel Bernd Horn, ed., *The Canadian War of War: Serving the National Interest* (Toronto: Dundurn, 2006), 265–296.

²¹ Hugh L. Keenleyside, *Memoirs of Hugh L. Keenleyside, Volume 2: On the Bridge of Time* (Toronto: McClelland and Stewart, 1982), 308.

²² *Ibid.*

²³ *Ibid.*, 310.

²⁴ Andrew Godefroy, *In Peace Prepared*, 49.

Godefroy's assessment finds support when we consider northern cooperation between the military and DRB scientists. While the air threat to North America dominated strategic considerations in Ottawa during the early postwar period, defence officials remained cognisant of the vulnerability of the Canadian North by sea and land. In advance of a potential Soviet land attack, the military turned to science to find and prepare men for the potential cold-weather battlefield. Defence planners deemed cold climate training important to the development of troop indoctrination and preparation, and intelligence confirmed the need to prepare a defence against the shortest and most direct route over the North Pole. Canadian troops were to learn how to survive and use their weapons under Arctic conditions, while DRB scientists were to isolate the masculine characteristics required of cold-weather soldiery. These circumstances developed from a Cold War ideology in which the environment featured prominently as a "laboratory" for scientific exploitation.²⁵

POSTWAR MILITARY ACTIVITY IN THE NORTH

The Canadian military first tested the adequacy of military men and equipment in the North during the winter of 1945–1946. Operations Eskimo, Polar Bear, and Lemming were designed to determine the effects of severe climatic conditions on the mobility and combat efficiency of Canada's striking forces. The location of each exercise differed, which allowed for the testing of equipment in northern environments under varying conditions and challenges of both terrain and temperature.²⁶ Exercises Musk Ox and North occurred the following year, as the army continued to improve tactics, techniques, and procedures for living and fighting in severe cold-weather conditions. None of these field exercises were large-scale operations, nor were they conducted to test the ability of joint land-

²⁵ While Canadian literature outside Lackenbauer and Farish (see note 6) has yet to broach this topic, similar themes have been addressed in the American context. See, for instance, Matthew Farish, "The Lab and the Land: Overcoming the Arctic in Cold War Alaska," *Isis* 104, no. 1 (2013), 1–29.

²⁶ For a brief overview of Canada's Winter Warfare Programme of 1944–1945, see Hugh A. Halliday, "Recapturing the North: Exercises "Eskimo," "Polar Bear" and "Lemming," 1945," *Canadian Military History* 6, no. 2 (1997): 29–38.

air operations to resist mock Soviet aggressor forces.²⁷ As a result, the army continued to conduct both individual and joint exercises with the Royal Canadian Air Force (RCAF).

Arctic warfare differed considerably from winter warfare in that its potential battlefield existed in vast spaces only reachable by air. Whereas units conducting winter warfare could rely on existing roads, railheads, and other supply infrastructure, Arctic warfare units trained to maximise self-containment and rely only on available air supply.²⁸ Canada took part in cold-weather warfare exercises in both Arctic and sub-Arctic conditions. Canadian and American military planners defined the “true” Arctic as any terrain north of the treeline, including tundra and mountain ranges. Conversely, planners defined the sub-Arctic as any northern treed terrain, including the treed plain of northern Manitoba and Saskatchewan, the Northwest Territories, the mountains of northern British Columbia, the Yukon, and southern Alaska.²⁹

In May 1946, the United States proposed to Canada a unified Arctic defence plan on the premise that neither the oceans nor the vast territoriality of the Arctic was anymore an adequate barrier to protect the northern half of the North American continent against long-range weapons or invading armies.³⁰ In the same month, the Canadian chiefs of staff approved the formation of an Interservice Committee on Winter Warfare, with a sub-committee on winter warfare research. By 1947 defence science expanded significantly in Canada and the sub-committee was subsequently reorganised as the Arctic Research Advisory Committee under the chairmanship of Hugh Keenleyside, the deputy minister of mines and resources and commissioner of the Northwest Territories.³¹ The committee held its first meeting on 15 May and decided that, while science could assist military operations in the Arctic, the military could also

²⁷ Godefroy, *In Peace Prepared*, 85.

²⁸ Halliday, “Recapturing the North,” 29–38.

²⁹ Dr. O.M. Solandt, Exercise “Sweetbriar”: An Address to The Empire Club of Toronto, 30 March 1950, RG 24, Volume 2484, File HQS-736-10-17-2-5, LAC.

³⁰ James Reston, “Unified Arctic Defense Plan Proposed by U.S. to Canada: Joint Bases, Weather Stations in Far North, Coordinated Training and Equipping of Forces in Scheme Put to Ottawa,” *New York Times*, 18 May 1946, 1.

³¹ Defence Research Board Arctic Research Advisory Committee, 5 December 1949, Appendix A “Summary of Activities of the Arctic Research Advisory Committee,” RG 85, Volume 298, File 1009-2[2], LAC.

be of considerable assistance to scientific research by provision of transportation, facilities, and personnel on occasion.

Although top officials in the Canadian defence establishment showed little interest in placing standing forces in the North, support for cold-weather military exercise training ran deep. Speaking to the House of Commons on 17 March 1950, Minister of National Defence Brooke Claxton spoke about his experience as an observer of exercise Sweetbriar, which took place during the winter of 1949–1950.³² The exercise tested the latest developments in clothing, food, aircraft, vehicles, weapons, and other equipment and material, but its primary objective was to develop doctrine and procedures for the employment of combined Canada-United States forces operating in the sub-Arctic.³³ Over five thousand combined forces took part in the ten-day exercise, which also included 978 motor vehicles and more than 100 aircraft. Sweetbriar was the largest joint Canada-United States northern military exercise at the time, so when speaking to the House, Claxton congratulated all officers and men who had, in his estimation, contributed to the success of the exercise “in accordance with the best traditions of the Canadian forces.” Claxton further applauded the exercise by noting specifically the effectiveness of cooperation between the army and air force, and Canadian and American troops.

Claxton was not the only top Canadian defence official to speak favourably about northern military training. A few weeks later on 30 March, Omond Solandt, Chairman of the Defence Research Board, made an address to the Empire Club of Toronto in which he spoke about his experience as a scientific observer of Sweetbriar.³⁴ Echoing Claxton’s comments, Solandt spoke of Sweetbriar with specific reference to training and equipment for combined sub-Arctic operations. The exercise did not involve new weapons and took place in weather conditions that were less severe than those encountered by both Canadian and American troops in training, but it did inspire novel equipment development and the need for further controlled cold-weather environmental training. The most important single

³² Government of Canada, House of Commons Debates, 21st Parliament, 2nd Session: Vol. 1, 17 March 1950, 853–854.

³³ *Ibid.*

³⁴ Dr. O.M. Solandt, Exercise “Sweetbriar”: An Address to The Empire Club of Toronto, 30 March 1950, RG 24, Volume 2484, File HQS-736-10-17-2-5, LAC.

lesson of Sweetbriar was, according to Solandt, the importance of and ease with which the Canadian and US armies operated harmoniously and effectively in severe cold conditions. When questioned about the success of the exercise, other Canadian and American military officials who attended as observers were noncommittal. Some expressed shock at the state of defences in the Canadian North, while others optimistically believed joint military preparedness remedied any existing deficiencies.³⁵ With regard to both the training of men and the use of equipment in cold weather, Canada's military and defence establishment determined many weaknesses of its northern defences. The exercise also made clear that neither Canada nor the United States was ready to conduct winter warfare; additional training was required.

Exercise Sweetbriar displayed the potential ability of troops to operate efficiently in the sub-Arctic and demonstrate the adequacy of logistical support under such conditions.³⁶ Combined support was an essential component of exercise Musk Ox, but not under the force strength that was available during Sweetbriar. Observers of Sweetbriar pointed out certain conditions incident to northern exercises that required improvement, but overall the exercise successfully dispelled unnecessary fears associated with cold-weather military operations. With proper clothing, equipment and training, troops were able to manoeuvre under sub-zero temperatures with fewer actual mock casualties than estimates had forecast. Observers concluded that logistic support was adequate to maintain larger forces and ongoing military operations in Canada's northern environment. Similar conclusions were being made simultaneously about 2,000 kilometres east at Fort Churchill, Manitoba by participants and observers of military exercise Sun Dog One.

SUN DOG ONE

Exercise Sun Dog One was an extension of infantry training that had taken place at Fort Churchill during the winter of 1948–1949. Located on the west bank of Hudson Bay in Manitoba's northeast

³⁵ Government of Canada, House of Commons Debates, 21st Parliament, 2nd Session: Vol. 4, 9 June 1950, 3408.

³⁶ Extract from US Army Field Forces Newsletter, 1 May 1950, RG 24, Volume 2484, File HQS-736-10-17-2-5, LAC.

corner, Fort Churchill's location, terrain, and harsh winter weather made it an ideal environmental locale for northern military training and scientific defence research. Sun Dog One comprised 251 personnel, which by comparison made the exercise significantly smaller than Sweetbriar.³⁷ The exercise consisted of an entirely self-contained and mobile force, who lived and travelled for nearly one month close to Fort Churchill. The tactical goal of Sun Dog One was to facilitate the appreciation of the probable role of armour, field artillery, and engineers in support of one infantry company operating in a severe cold-weather environment.³⁸ All appreciations assumed that supply to all units was available. The one-month time allowance enabled repetition of certain techniques and ensured time for exercise workability, photographic retakes, and variation in weather.³⁹ Planners sacrificed some measure of realism for scientific observation.

The operational concept of exercise Sun Dog One envisaged the pursuit and destruction of an enemy party approximately fifty strong, which dropped near the Hudson Bay railway at Chesnaye. The exercise began on 16 February 1950 and ended nearly one month later on 15 March. Planners chose the route and terrain of the exercise specifically to test the supply and communication organisation of participating personnel. The first leg of the route took troops through heavily bushed terrain on a trail prepared by a Royal Canadian Engineers Test Team. The remaining distance traversed flat and open tundra covered by many small lakes and sloughs. In open areas, snow was hard, shallow, and rough with wind anvils, while in treed areas it collected in deep and soft powdery drifts. Temperatures during the exercise were somewhat below the normal mean for that winter. The lowest temperature recorded was minus forty-two degrees Celsius and the mean approximately minus twenty-nine degrees Celsius. The maximum recorded wind chill was 2,300 or approximately minus fifty degrees Celsius and the mean was 1,700 or approximately minus thirty degrees Celsius.⁴⁰ While these temperatures were comparatively higher than other Arctic locales from the same winter, high winds

³⁷ Winter Exercise "Sun Dog One," RG 24, Volume 4206, File 270-0-89-6, LAC.

³⁸ Training Wing Fort Churchill: Exercise Sun Dog 1, RG 24, Volume 2484, File HQS-726-40-39-7, LAC.

³⁹ For a detailed description of Sun Dog One, included photographs of the exercise, see Brief on Exercise "Sun Dog One," 25 February 1950, RG 24, Volume 2484, File HQS-726-40-39-7, LAC.

⁴⁰ Ibid.



Canadian parachute-qualified personnel who will be posted to the 1st Canadian Parachute Battalion undertaking winter infantry training at A-35 Canadian Parachute Training Centre (Canadian Army Training Centres and Schools), Camp Shilo, Manitoba, Canada, 20 March 1945. [Capt. Frank Royal / Canada. Dept. of National Defence / Library and Archives Canada / PA-209722]

experienced during the exercise did at times drastically increase the rate of heat loss in participating troops.

Canadian exercises in winter and Arctic warfare prior to Sun Dog One demonstrated the limits of troops operating in demanding conditions, not of survival but of endurance. Varying topography and climate in both dry and wet cold conditions reduced the operational effectiveness of all forces. Sun Dog One was a combined military exercise of a tactical nature in Canada's eastern Arctic. The exercise served to test certain military assumptions about cold-weather operations and demonstrated many operational difficulties peculiar to Canada's northern environment. For instance, troops found that the same clothing that enabled them to conduct operations in the Canadian Arctic also reduced their manoeuvrability and overall effectiveness. Clothing restricted motor control, particularly during periods of high wind chill when closed parka hoods reduced visibility and hearing. Mitts restricted dexterity of the hands and the troops' ability to handle weapons. Frequent and rapid weather changes also significantly decreased the operational effectiveness of both men and equipment during Sun Dog One. As noted in a diary of the exercise,

the constant breakdown of snowmobiles was a dominating feature of the troop experience.⁴¹ Such reoccurring failures of equipment significantly reduced opportunity for tactical study and in turn slightly obscured the value of recorded information. Yet the exercise as a whole allowed observers to make many useful conclusions about cold-weather military operations.

ACCLIMATISATION AND INDOCTRINATION

Considering the vast range of the potential cold-weather battlefield, acclimatisation of personnel to the Arctic environment was a chief scientific concern of Canada's defence establishment early in the Cold War. While making his remarks about exercise Sweetbriar to the House on 17 March 1950, Minister of Defence Brooke Claxton stated: "Fighting in the north we know requires specially trained personnel of high morale and top physical condition with first-class equipment and air supremacy. These have been our targets and we are making good progress."⁴² At the time, the logistical difficulties of cold-weather military preparedness of both men and equipment had extended beyond the institutional capabilities of the army, or so was the belief of Canada's top military advisers.

By order of Lieutenant-General Charles Foulkes, Chief of the General Staff, the Canadian army conducted exercise Sun Dog One in part to assist the Defence Research Board (DRB) in the execution of its Acclimatization Research Programme.⁴³ Established in 1947, the DRB was as an agency of the Department of National Defence. As Canada's first peacetime military science establishment, the DRB's primary mandate was to provide scientific and technical assistance to the Canadian armed forces as well as policy advice to the minister of national defence.⁴⁴ The board was civilian staffed and directed, but a significant portion of its personnel had military experience

⁴¹ Ibid.

⁴² Government of Canada, House of Commons Debates, 21st Parliament, 2nd Session: Vol. 1, 17 March 1950, 854.

⁴³ Army Headquarters, 3 January 1950, RG 24, Volume 2484, File HQS-726-40-39-7, LAC.

⁴⁴ For an institutional history covering the early formative years of the DRB, see Captain D.J. Goodspeed, *DRB: A History of the Defence Research Board of Canada* (Ottawa: Queen's Printer, 1958).

from conducting operations research in the Second World War.⁴⁵ Operational researchers and defence scientists helped the military better understand the many characteristics of winter warfare by collecting raw data for further analysis through study of army physical training exercises.⁴⁶ Among the more active of DRB's research facilities in the early Cold War period was its Defence Research Northern Laboratory at Fort Churchill, a location that had an initial construction budget of one and a half million dollars in 1948–1949.⁴⁷

Although northern military exercises aimed to determine the requirements and tactical techniques of supporting arms and services operating in cold climate conditions, a select number also supported Canada's wider military and defence research that aimed to understand the physical and psychological requirements of cold-weather soldiery.⁴⁸ The DRB conducted its Acclimatization Research Programme as part of this process at Fort Churchill during the winter of 1949–1950. The research aimed to study the effect of vitamin C on the physiological adaptation to cold of personnel while in Canada's Arctic environment. Scientists administered two sets of pills to two groups of troops who conducted physically demanding military operations under severe cold as part of exercise Sun Dog One.⁴⁹ The first group received placebo pills containing no vitamin

⁴⁵ Operational research (OR) involved scientific investigations carried out in the field of operations and became widely recognised during the Second World War when careful observations, analyses, and conclusions were first applied profitably to wartime operations. For information on Canada's wartime OR in the Second World War, see Terry Copp, *Montgomery's Scientists: Operational Research in Northwest Europe* (Waterloo, Laurier Centre for Military, Strategic and Disarmament Studies, 2000). Postwar OR concentrated primarily on combinations which involved weapons, communications, transports and other systems that employed electronic and mechanical components; see 44327—The Defence Research Board Canada, JGD/MG01 (John G. Diefenbaker fonds), Volume 76, File VII/A/614, University Archives and Special Collections, University of Saskatchewan. The Operational Research Group of the DRB was specifically responsible for projects of joint-service or general defence interest and for supply and coordination of civilian scientific personnel. See Defence Research Board: Debate of the Annual Estimates in the House of Commons 1952, RG 24, Volume 4210, File 69-180-262, LAC.

⁴⁶ Godefroy, *In Peace Prepared*, 85.

⁴⁷ Programme of Works for 1948–49 Joint Testing Station Fort Churchill, Manitoba, RG 24, Volume 4150, File 52-751-268-1 vol. 2, LAC.

⁴⁸ Winter Exercise "Sun Dog One," RG 24, Volume 4206, File 270-0-89-6, LAC.

⁴⁹ The exact number of test participants remains unclear, but the DRB initially requested the volunteer participation of thirty soldiers. See Defence Research Northern Laboratory: Acclimatization Research Programme 194-50 Fort Churchill, RG 24 vol. 2484, file HQS-726-40-39-7, LAC.

C while the second group received pills containing 500 mg per day. Each test participant underwent a medical examination prior to and following the experiment. Scientists also conducted urinalysis, blood pressure measurements, and blood analysis twice weekly on troops throughout the duration of the programme, which lasted from January to March 1950. Each participant was administered pills prior to, during, and following exposure to cold and was granted one week extra leave following the completion of the test period. In their capacity as observers, DRB scientists received instructions to avoid doing anything that would interfere with the conduct of exercise Sun Dog One. The evaluation of the capabilities and limitations of all participating arms and services was important to both the Canadian military and defence establishment in evolving tactical doctrine for northern warfare.⁵⁰

The DRB's acclimatisation research associated with Sun Dog One was not the first attempt by scientists to deduce information about cold-weather operations from participants. Scientists utilised volunteers as test subjects in similar trials a year prior to Sun Dog One in January and February 1949. Arrangements at the time were in place to use volunteer troops stationed in the North, but before tests commenced the army decided to pull its participation. In order to meet the requirements of lead scientist Norman Mackworth, a meeting was then held of administrative and service heads when, "[a]fter much controversy over morale and other problems ... it was realised that the absolute limit had been reached on the provision of test subjects."⁵¹ Tests went ahead nonetheless and the scientists utilised persons already employed at Defence Research Northern Laboratory (DRNL) in Fort Churchill.

Funded jointly by Canada and the United Kingdom, the tests conducted at DRNL were the first in a series of two.⁵² Fort Churchill provided researchers the opportunity to conduct fieldwork in the

⁵⁰ General Instruction for Observers Participating in Exercise "Sun Dog One," RG 24 vol. 2484, file HQS-726-40-39-7, LAC.

⁵¹ Provision of Test Subjects for Defence Research Board, RG 24 vol. 2484, file HQS-726-40-17-11, LAC.

⁵² The acclimatisation research conducted by Norman Mackworth and his team was jointly financed by the DRB of Canada, as well as the Medical Research Council and the Medical Department of the Royal Navy. For a published account of the experiments, see N.H. Mackworth, "Finger Numbness in Very Cold Winds," *Journal of Applied Physiology* 5, (1953), 533-543 and N.H. Mackworth, "Cold Acclimatization and Finger Numbness," *Proceedings of the Royal Society of London, Series B, Biological Sciences* 143, no. 912, (1955), 392-407.

Canadian North under “natural conditions of cold” and compare results to data recorded from physical observations of participants who underwent similar examinations in a simulated cold-weather experiment at Cambridge, England. Although the army was tentative to cooperate, it seems troops already stationed at DRNL did eventually participate as volunteers.⁵³ Mackworth and his team conducted two experiments to test the hypothesis that cold exposure may bring about changes in skin texture that act as a “glove,” thereby improving manual dexterity and performance in the cold by protecting the hands against the transmission and loss of heat. In the first test, researchers compared the sensitivity of a group of Aboriginal troops considered “well acclimatised” to that of “unacclimatised” white troops. In the second, researchers compared recorded skin sensitivity measurements taken before and after exposure to severe cold while on exercise to results of similar tests conducted in the Cambridge laboratory simulation. Results from both cases reported no significant differences between those considered already acclimatised and those not.⁵⁴

Thirty-five volunteers comprised the first test group, of which twenty were members of the Canadian army, nine were scientists, and the other six were “labourers.” Mackworth and his team conducted finger numbness tests on volunteer participants using an experimental V-test apparatus. The V-test apparatus consisted of a flat wooden ruler cut in half. The two halves of the ruler were bolted together at one end, and at the other end were separated by half an inch. The gap between the two inner edges of the device ranged between zero and thirteen millimetres, according to the particular part that touched the tip of the tested finger. Instructed to look away as researchers administered the test, participants said whether they felt a gap when

⁵³ Available records are slightly ambiguous on this point. Military documents suggest troops from exercise Prairie Tundra Two (1952) were utilised as test subjects, whereas Mackworth’s published report in the *Journal of Applied Physiology* dates the experiments to January and February 1949. The dates provided by Mackworth coincide with the operational dates of Sigloo, seemingly making it the exercise during which troops also volunteered to participate in acclimatisation research. It is also plausible that troops volunteered to take part in DRNL research while not as part of a formal military exercise.

⁵⁴ The “test subject” indicated when he first felt the two edges of the apparatus as one; the width of the gap was the discrimination score charted on the “numbness index.” For information on the administration of the V-test at Fort Churchill, see M.F. Coffey, “Results of a Test for Changes in Skin Sensitive after a Period of Acclimatization to the Cold,” DRNL Technical Paper No. 16, November 1953, RG 85, vol. 299, file 1009-2[5], LAC.

the examiner firmly pressed the two edges against the tip of the left forefinger. Researchers obtained ten such threshold readings from each participant prior to cold exposure and averaged the readings to establish an individual control.⁵⁵

To test participants in the cold, researchers constructed a canvas-lined tunnel equipped with a system of adjustable shutters designed to channel prevailing winds. Researchers administered tests only on “cold” or “very cold” days, when temperatures ranged from minus twenty-five to minus thirty-five degrees Celsius and wind speeds in the tunnel ranged from zero to ten miles per hour.⁵⁶ Each test participant entered the wind tunnel and stood at such a position that their test hand was to the direction of the wind. A woolen glove fully covered the test hand, except for one finger, left entirely bare for an exposure time of three minutes. While exposed to the cold, researchers obtained ten threshold readings from each participant. The first reading was after one minute had passed and the others roughly at twelve-second intervals thereafter. Administrators of the test used these readings to devise a “numbness index,” and compared the effect of cold and wind speed on manual dexterity.⁵⁷

Mackworth calculated his data based on results obtained during cold exposure at five to ten minute intervals. He used measurements from the two-point tactile discrimination V-test to assess the finger numbing effects of severe cold and wind chill conditions. Researchers recorded 109 pairs in total, and Mackworth concluded that even moderate winds lowered skin temperatures and increased the risk of frostbite. He made this assessment partly in response to injuries that occurred during the tests. On 9 February 1949, three “test subjects” reported to the local station hospital complaining of pain in the left index finger. The hospital report dated two days later stated that all three men were “in a painful stage of defrosting” that “render[ed] their fingers useless for an average of seven days.”⁵⁸ Prevented from carrying out their regular duties as a result of their physical injuries, these men were also reported to have had suffered from a “morale problem.”⁵⁹

⁵⁵ For a photograph of the V-test apparatus, see Mackworth, “Finger Numbness in Very Cold Winds,” 533–543.

⁵⁶ *Ibid.*

⁵⁷ *Ibid.*, 535.

⁵⁸ Provision of Test Subjects for Defence Research Board, RG 24 vol. 2484, file HQS-726-40-17-11, LAC.

⁵⁹ *Ibid.*

Mackworth told a slightly different version of the story. In a published report of the experiments, he noted two rather than three injuries: “Two of the subjects later developed a minor frostbite in the finger that had been exposed and both were from the small group of four persons who experienced the worst environment of all—the highest wind speed of 8.1 to 10.0 mph and the very cold air temperature.”⁶⁰ Under such extreme conditions, a change from normal sensitivity to “total anesthesia,” or the complete loss of feeling in the finger, occurred in under two and half minutes from the beginning of exposure. The sudden onset of numbness resulted in a “[p]rolonged lowering of skin temperature ... especially in subject D, who later developed a rather more severe lesion perhaps because of the nutritional impairment [that] lasted longer [possibly as a result of reduced blood flow].”⁶¹ Both frostbite “subjects developed definite surface reddening of the exposed finger” in under three minutes of return to the warm room, at which point “their fingers were still nearly freezing.”⁶²

Mackworth further described both frostbite victims with specific reference to each injury: “*Subject C* had a pale, white area about two inches long and one-quarter of an inch broad on the index finger on the side that had been nearest the wind source. This stretched from the proximal inter-phalangeal joint to the tip of the index finger where it broadened to about half-an-inch across.”⁶³ The injury was severe enough to restrict movement of the measured joint by forty-five degrees and caused “some pain and tenderness but no detectable swelling.” Yet by comparison, the other frostbite victim fared worse, according to Mackworth: “*Subject D* was more severely affected and had a definitely red and swollen forefinger ... [that] was markedly tender and painful, although it did not keep the subject awake at night.”⁶⁴ Fortunately, for both men, these injuries, what Mackworth referred to as “accidental” and “temporary” effects of research, did not prevent complete recovery. In both cases, the injured troops returned to work after being off for four days.

Although Mackworth concluded that only two out of all tested personnel succumbed to frostbite, another thirteen recorded single

⁶⁰ Mackworth, “Finger Numbness in Very Cold Winds,” 538.

⁶¹ *Ibid.*, 539.

⁶² *Ibid.*

⁶³ *Ibid.*

⁶⁴ *Ibid.*, 540.

skin temperature readings lower than five degrees Celsius following exposure to severe cold. Of the thirteen, seven had skin temperature readings in the range between those recorded of “subjects C and D,” or three point four degrees Celsius and minus two point three degrees Celsius. At such low skin temperatures the onset of pain felt by participants, especially those subjected to wind chill conditions, resulted in reports of “definite discomfort.” The provision of “test subjects” stopped immediately following the reported injuries, but on 24 February DRNL and Mackworth submitted a further request for test subjects for use in “modified less-severe tests.”⁶⁵ In response to the request, the army agreed to provide volunteers for use in manual dexterity tests where, according to military records, “no temporary or permanent injury [would] result.”⁶⁶ Moving forward, the army agreed only to provide volunteers on the grounds that experimental trials did not interrupt military training.

Sun Dog One offered an opportunity to extend acclimatisation research conducted at DRNL. While scientific testing was limited to a select number of volunteers, all participating troops underwent a three week long indoctrination course prior to the exercise at either Shilo, Manitoba or Petawawa, Ontario, followed by an additional two weeks of Arctic acclimatisation training at Fort Churchill.⁶⁷ Training involved manoeuvres in severe cold as well as the attempted development of a specific mental acuity derived specifically from the necessity to overcome the determinants of manual dexterity in northern military operations. To meet this goal, indoctrination training included lectures and exercises on snow craft, sea-ice, bush living, and over snow vehicles.⁶⁸ Troops learned how to erect tents, use sleeping bags, give first aid, use a cooker, ski and snowshoe, transport by sled and sleigh, navigate, and protect their hands in order to properly and effectively handle metal weapons and supplies in extreme cold.⁶⁹ Indoctrination also adopted cold-weather living

⁶⁵ Provision of Test Subjects for Defence Research Board, RG 24 vol. 2484, file HQS-726-40-17-11, LAC.

⁶⁶ Ibid.

⁶⁷ Wainwright, Alberta was also used as a location for indoctrination training but not in preparation for Sun Dog One—the Princess Patricia’s Canadian Light Infantry were indoctrinated there in training for Sweetbriar; see George Bain, “Canadians Show Up Favorably,” *The Globe and Mail*, 6 March 1950, 17.

⁶⁸ “Arctic Training Cuts Casualties,” *The Globe and Mail*, 21 February 1948, 3.

⁶⁹ “Will Teach War This Winter At Four Canadian Schools,” *The Globe and Mail*, 29 November 1948, 17.

and survival techniques known to Inuit. Troops learned to construct “snowhouses” similar to the igloo, tested clothing and dress techniques other than army standard, and practiced Arctic navigational methods that utilised demarcation points in the natural environment around Fort Churchill.⁷⁰

COLD-WEATHER PERFORMANCE AND MILITARY MASCULINITY

Based on the collective experience of Arctic acclimatisation and indoctrination, the final report of Sun Dog One declared that ten weeks was the minimum period acceptable for northern cold-weather training up to the battalion level. A proposed schedule of training suggested three weeks indoctrination, two weeks trades training, three weeks cold-weather familiarisation, and two weeks collective training. In order to be of proper value, the report further suggested that training only take place in conditions of climate and terrain comparable to those of the projected theatre. Otherwise, the success of the military operation “would be seriously prejudiced.”⁷¹ The report concluded that properly trained and equipped troops could operate successfully and with a degree of high morale in climates of extreme cold for periods up to thirty days under active conditions. The “ordinary” soldier conducting “normal” duties was comparable in efficiency in the North to the soldier operating in other, more temperate theatres. Yet the efficiency of the tradesman in tasks requiring manual dexterity was as little as 50 per cent of “normal” under severe cold weather and high wind conditions.

Observers of Sun Dog One also noted that tactical mobility, both dismounted and mechanised, was a primary deficiency of the exercise. Three out of every five men were required to either haul or carry the group living equipment, which left only a maximum of 40 per cent human strength to transport infantry support weapons, additional ammunition, and fulfill other necessary operational duties. Observers considered this unacceptable and recommended in the exercise

⁷⁰ The term igloo derives from the Inuit word iglu (plural igluit), which can refer to a structure built of any material and is not restricted exclusively to snowhouses. For details on “snowhouse” construction at Fort Churchill as part of indoctrination training, see Winter Exercise “Sun Dog One,” RG 24, Volume 4206, File 270-0-89-6, LAC.

⁷¹ Ibid.

final report that weight reductions in rations, fuel, tentage, and other operational equipment be implemented to produce the “lower standard of comfort” necessary to overcome the “dangers and hardships of the cold [that] have been brought into reasonable perspective” by Sun Dog One.⁷²

Manliness was a purview of the successful troop on Sun Dog One. Although the conclusions of the Royal Canadian Infantry Corps conceded, “there is no requirement for special troops” to conduct cold-weather military operations, “special Arctic training” was determined necessary to acclimatise and indoctrinate “ordinary” soldiers. Under conclusions and recommendations of personnel, the final report of Sun Dog One noted the necessity of indoctrination to “weed out any soldiers who are weak physically or who are NOT temperamentally suited to be part of a small group for a long period.”⁷³ Indoctrination aimed specifically to remove the “undesirables” who “only cause a lowering of morale and do not pull their share of the weight.”⁷⁴ This extended to persons with glasses or persons who had undergone skin grafting on the face, as both might be unable to operate to the required level of efficiency in certain cold-weather capacities.

Military discourse also equated performance in the cold to attitudes about virile masculinity. In exceptional circumstances, frostbite necessitating medical attention was a matter of disciplinary action. In other words, planners of Sun Dog One recommended that troops receive penalty for personal injury that resulted from “negligible” exposure to severe cold.⁷⁵ If frostbite were to occur, troops were to assume personal responsibility for their injuries and report for subsequent punishment. Despite this recommendation, there seems to be no record of disciplinary action ever having resulted from a frostbite injury. Nevertheless, the forethought does highlight the gauche understanding of virile notions toward the development of cold-weather soldiery. The military ultimately concluded, “troops need not be hand-picked” for Arctic service but “some weeding out during the training period must be permitted to eliminate temperamentally or physically unsuitable men who would otherwise become liabilities

⁷² Ibid.

⁷³ Ibid.

⁷⁴ Ibid.

⁷⁵ Disciplinary action was “taken against personnel in camp suffering from frostbite when there [was] evidence of negligence,” see Provision of Test Subjects for Defence Research Board, RG 24 vol. 2484, file HQS-726-40-17-11, LAC.

during operation.”⁷⁶ Evocative of this very process, acclimatisation and indoctrination was symptomatic of broader Cold War desires to understand and overcome physical and climatic constraints, where science, as Matthew Farish points out, was used in an attempt to create the “masculine Cold Warrior” capable of recognising and regulating as far as possible “a set of hostile natural environments.”⁷⁷

In creating space for Canada’s cold-weather soldier to assume the conceptualised role of the Cold War national protector, acclimatisation research and indoctrination training perpetuated and legitimised postwar modernist ideals of masculinity. Research and training aimed to equip troops with the proper levels of pugnacity, truculence, and testosterone required to remain effectively “aggressive” under conditions of extreme cold. Contemporary attitudes suggested great physical and mental strength derived from such qualities, and so the maintenance of a high level of morale depended on virile notions of soldiery. According to DRB scientist and Arctic military exercise observer Cecil Law, well trained and indoctrinated troops “could run circles around the mobile strike force” and were essentially no match in the cold against untrained and unacclimatised units.⁷⁸ Military and defence records pertaining to Sun Dog One paint a similar picture. Reports suggest that Arctic acclimatisation and indoctrination was effective training for cold-weather military operations. Canadian troops never fought in an operation that would test their abilities in the cold, so the effectiveness of northern training remains questionable. What is clear is that there is no evidence to suggest that training instilled in troops certain innate qualities required of northern military defence. The development of cold-weather military masculinity was superficial.

CONCLUSION

This article means not to suggest that Sun Dog One is fully representative of Canada’s early postwar Arctic military training. Nor does it suggest that Sun Dog One represents the full extent of

⁷⁶ Winter Exercise “Sun Dog One,” RG 24, Volume 4206, File 270-0-89-6, LAC.

⁷⁷ Matthew Farish, “Creating Cold War Climates: The Laboratories of American Globalism,” in J.R. McNeil and Corinna R. Unger, eds. *Environmental Histories of the Cold War* (Cambridge: Cambridge University Press, 2010), 51–83.

⁷⁸ Interview with Cecil Ernest Law [sound recordings]: CWM Oral History Project, 6 August 2008, Interview Control Number 31D 9 LAW, Canadian War Museum Archives.

scientific collaboration between the DRB and the military. Indeed, the Canadian military participated in no fewer than twenty-two northern exercises in the first decade of the Cold War.⁷⁹ Scientists featured regularly as observers, referees and participants. Nevertheless, Sun Dog One was unique. When Omond Solandt made his address to the Empire Club of Toronto on 30 March 1950, he spoke briefly about Sun Dog One and of the importance of collaboration between Canada, the United States, and Britain in defence of the Arctic. In his mind, exercises Sweetbriar and Sun Dog One had collectively demonstrated that two or more sovereign nations could effectively carry out joint military exercises in severe cold conditions. Solandt's speech was a clear and public Cold War message that the Canadian military and defence establishment was fully committed to Arctic defence, and was not alone in its stand. Yet when discussing the importance of northern military operations to the Canadian public, Solandt and other military and defence representatives chose to highlight only the benefits of indoctrination training and joint operational execution. It seems the specifics of vitamin C research and acclimatisation testing went unknown to the public, but evidence has survived through military and defence records as well as published medical reports.

Available evidence makes clear that in the immediate postwar period the Canadian army sought a deeper understanding of the many characteristics of winter warfare and in its search embraced experimental scientific study in an attempt to deduce information unique to the development of cold-weather soldiery. Northern environmental conditions required special investigation because the Canadian Arctic and sub-Arctic climate deviated significantly from the conditions under which most of the army's concepts, doctrine, and tactics were developed.⁸⁰ Operational researchers and defence scientists contributed at the time by collecting raw data for further analysis through participatory study of the army's physical training exercises. Men were the chosen test subjects.

Although not surprising considering what little reference they receive in the lexicon of Canada's military history, terms such as acclimatisation and indoctrination find little reference with the Canadian military establishment. This should be of particular

⁷⁹ See note 2.

⁸⁰ Godefroy, *In Peace Prepared*, 87.

concern to scholars of Canada's military in the Cold War, because together acclimatisation and indoctrination comprised the base upon which a unique form of military preparedness developed in northern Canada in the early postwar years. Canada's postwar military doctrine derived from societal factors and the nature of the Cold War within which science, defence, and diplomacy occurred. As evident by cold-weather research and training conducted at Fort Churchill and as part of Sun Dog One, defence science, in addition to geopolitics, shaped Canada's Cold War national security apparatus.

Cold-weather testing on male troops supported and perpetuated idealised notions of virile soldiery. Involving researchers and scientists in important military investigations on northern warfare developed, in theory, a model for future combat development work. From proper scientific analyses in climatic conditions, the Canadian military and defence establishment hoped to derive information to improve operational concepts, doctrine, and tactical principles pertinent to cold-weather warfare.⁸¹ Sufficient knowledge and adequately satisfactory research material was deemed to have been obtained because of Sun Dog One and other comparable cold-weather exercises. The negative consequences that resulted from acclimatisation research appear only briefly in available records. Researchers desired the potential benefits of cold-weather scientific discovery in spite of any moral or ethical issues that stemmed from human testing. While additional research is required to elucidate the deep implications of postwar defence science in Canada, it seems safe to suggest that the human and environmental legacy of Cold War militarism deserves attention.



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⁸¹ Ibid., 89.

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