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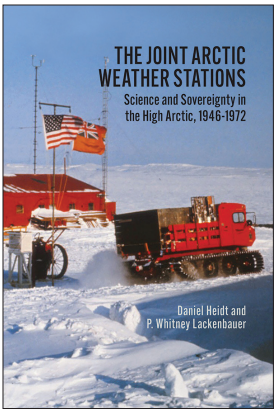

THE JOINT ARCTIC WEATHER STATIONS: SCIENCE AND SOVEREIGNTY IN THE HIGH ARCTIC, 1946–1972

by Daniel Heidt and P. Whitney Lackenbauer

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Negotiating JAWS, 1945-47

> A great gap exists in the network of Arctic aviation facilities, including weather, magnetic, and ionospheric stations, air navigational aids, communications and air fields; that this gap extends from Spitzbergen westward over most of Greenland, the Canadian Islands, and the Arctic Ocean to Siberia, and results in a serious lack of knowledge for interpolating meteorological data across the polar area, for forecasting the southward surge of cold Arctic air masses, for the preparation of suitable aeronautical charts, for the study and prediction of radio conditions, and generally for safeguarding air operations.
>
> … I have now been directed to reaffirm and stress the interest of my Government in this program and to urge upon the Canadian Government the necessity of proceeding without delay toward the establishment in the northern areas of this hemisphere of adequate meteorological and other reporting stations.
>
> US Ambassador Ray Atherton (1946)[1]

Ambassador Atherton's appeal to the Canadian government in late 1946 revealed a sense of urgency to address what US meteorologists saw as a critical deficit: weather data from Canada's High Arctic, a region that

remained "meteorologically unexplored." Data collected from the still hypothetical stations in this remote region would fill a major void, facilitating international civil flights over the Pole as well as long-range military operations in support of continental defence. Furthermore, weather observations on Canada's northern islands would bring direct benefits to North Americans more generally, aiding "farming, construction, transportation merchandizing, and many other activities, as well as the every day life of the individual," according to one report. While the North American allies had no systematic data of atmospheric conditions in their far north, the Soviet Union — which was quickly emerging as their chief postwar competitor ideologically and militarily — had already established an estimated 137 meteorological stations north of the Arctic Circle. Nordic states also had modestly expanded their meteorological footprint in their high north.[2] The US government had already secured congressional support to fund its plans, thanks largely to the indefatigable Charles Hubbard. What remained was securing the consent and cooperation of the Canadians who claimed the islands upon which the stations would be built, but who remained worried that their American allies might not respect this sovereignty.

Lieutenant-Colonel Charles Hubbard had proven instrumental in selling this vision to the US government — and in generating apprehension in Ottawa. Born into a wealthy family in Kansas City in 1902, one report suggested that "his boyhood was that of any other Midwestern American boy, until the age of 14 when he broke the pattern by going on an expedition to Labrador with the Grenfell mission. The adventure created a passion for exploration he was never able to overcome." After returning from Labrador, he attended Harvard University, where he captained the football team and joined the Harvard crew. In his senior year, he won the Francis H. Burr award for his balanced leadership, scholarship, and athletics. With honours in arts and engineering degrees in hand, "he attempted to lead an eventless professional life as a civil engineer," but the lure of the Arctic proved too strong. He listed his official occupation in the decade before the start of the Second World War as explorer and freelance writer. In 1931, for example, he was a cartographer and aviator on the Forbes-Grenfell North Labrador Expedition. Over the next three years, he owned and captained the expedition ship, combining cartography with

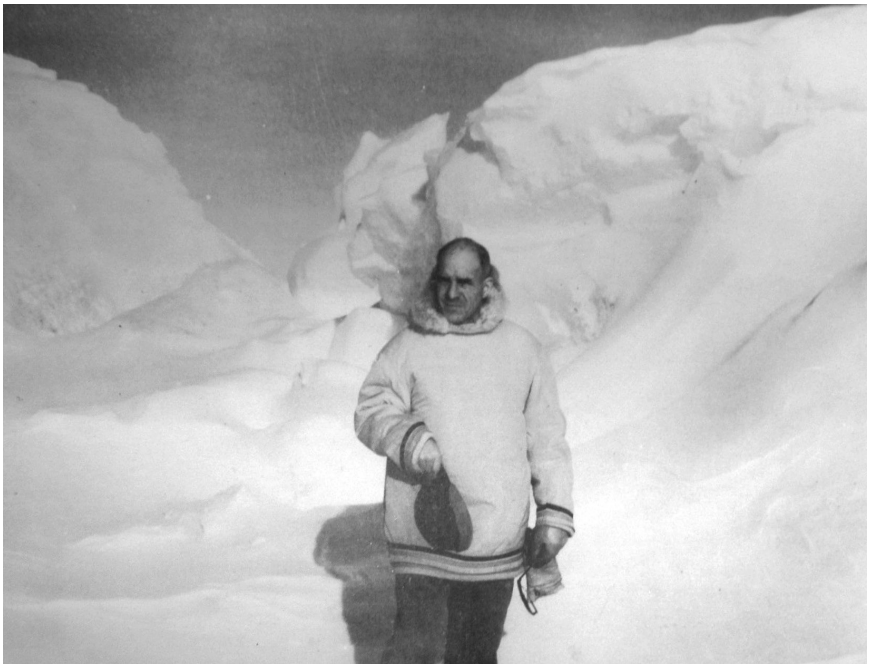

Figure 2-1. Charles Hubbard at Alert, spring 1950. NARA, RG XPOLA, Entry 17, Charles Hubbard Papers, Box 5, File Report on Airlift Operations, Spring 1950.

meteorological and oceanographic observations. He then sailed south in 1936 and 1937, taking his small schooner to the Galapagos Islands on a special assignment for *Liberty Magazine*. For the next three years Hubbard wrote extensively for national magazines in the US and lectured on his adventures.[3] "He could think and plan and write and speak — and thus could translate his ideas efficiently to the many people whose support was necessary," his wife Harriet recounted. He was a trained architect and engineer, "one of the most skillful, patient and ingenious mechanics, a first class carpenter" and draughtsman, with years of experience in flying, sailing, and outdoor living.[4]

Hubbard's experience in the Arctic and other remote regions attracted the attention of the US military during the Second World War, given the global scale of the conflict. In light of his explorations and his amphibious background, defence officials deliberated whether he would better serve

the army or the navy. He ultimately served both. Hubbard entered the US Navy as a lieutenant commander in the Naval Reserve in January 1941. That September, the Army "borrowed" him to serve as a special assistant to General Henry H. "Hap" Arnold, the commanding general of Air Transport Command, to oversee the development of aviation facilities in the Arctic. In three weeks, he organized an expedition to establish three Crystal stations in the eastern Canadian Arctic, amassing supplies, radio equipment, and meteorological instruments to load onto the fleet of eight trawlers. On their northward course, the military commander of the expedition came to appreciate Hubbard's seafaring and Arctic knowledge, and tasked him to take one ship ahead of the fleet to locate a site for Crystal Three — the most northern base. "It was an adventurous project, for the journey was long, the east coast of Baffin Island was wild, uncharted, and almost unknown, and the season was so late," Alexander Forbes recounted. After picking the location and sounding (measuring the depth of) the passage, Hubbard retrieved two other ships and guided them to Padloping Island. The units discharged their cargos, built the base, and pulled out "just in time, for by early November the waters were closed in the grip of winter."[5] The following year he was at it again, borrowed by the US Army Air Forces (USAAF) Ferry Command to oversee the resupply of the stations, plan their expansion, and discern problems including the location of runways, station leadership, communications, equipment shortages, cargo discharge, and local ice conditions.[6]

By this point, Hubbard had joined the Army Air Forces as a lieutenant-colonel. Since the USAAF had assumed responsibility for the Arctic installations from the US Navy, he moved laterally across the services to continue his work. Having established the first weather stations in Labrador, Baffin Island, and Greenland, he grew disenchanted when the Army cancelled plans for thirty northern weather stations and then shut down the processing centre that he had organized and commanded to train and equip Arctic teams.[7] "Charlie was at heart a one man army," his wife noted, and he became disillusioned with his opportunities in Air Transport Command. For example, he was tasked to develop a Search and Rescue Service for the world-wide flight routes of Air Transport Command — "an outgrowth of the many lost planes on the Arctic air routes and also

of the end of the development of the Arctic as the war took a more southern turn" — but this was "limited to writing a few regulations."[8]

Behind the scenes during the winter of 1943–44, however, Hubbard was hatching a much bolder plan: a line of weather stations across the North American Arctic. Every night in his study, after completing his military duties for the day, he poured over Sears Roebuck catalogues to determine the weight and cost of the necessary equipment. He studied Arctic maps, "scrutinized all the army and navy material on building bases and supplying them," and read every Arctic book he could find. He discussed his ideas with an aerologist in the US Navy who provided information on the latest scientific equipment. "Charlie came to the conclusion that neither he nor anybody else really knew how to build a first class scientific station in the arctic," his wife explained. "His idea was that the only good stations were small, very neatly and accurately engineered (to meet the weight and size limitations of air transportation) with materials and plans that had never been fully investigated, and staffed with hand-picked personnel." When he pitched a tentative plan to his air force colleagues, they were unimpressed. Confident in the Arctic's importance — and cognizant of an opportunity to carve a niche for himself that would serve him in postwar civilian life — Hubbard persevered in his research.[9]

In August 1944, Hubbard articulated his emerging vision for the High Arctic stations in the *Saturday Evening Post*. "The top of the world has two things we desperately need — information about our own weather, and short transportation routes to other lands," he proclaimed. Meteorological knowledge, in particular, was the Arctic's primary resource to contribute to the modern world:

> Strictly speaking, it is the meteorology of the far north rather than the plain weather which interests us. Though we still have a great deal to learn about the science of our envelope of atmosphere, its application to our modern life is increasingly obvious. The air seems likely to become even more important than the oceans as a medium of transportation. In the present war, reliable weather anticipation may be decisive on land and sea and air. If we are planning either a transocean flight or a Sunday-school picnic, forecasts control our normal activities

> in a thousand different ways. They help the farmer protect his crops and the builder choose auspicious days to dig foundations for a new house.

The US Weather Bureau estimated that its services were worth more than a billion dollars in national income. "We cannot change the weather," Hubbard observed, "but if we know what is to happen far enough in advance, we are able to take precautions against floods and hurricanes and blizzards."[10] To this, one could add precautions against transpolar aerial attacks — a future concern as long as America's wartime alliance with the Soviet Union against the Axis Powers remained intact.

Hubbard saw his plans for a string of weather stations, spaced five hundred miles apart across the Canadian Arctic islands and Greenland, as a service to humanity (and especially North Americans) made possible by modern technology. This would be a vast improvement over the lacunae of information that existed in 1944, and data collected four times daily would be "synchronized with meteorological reports from all over the world." Prefabricated buildings, carried north by transport aircraft, would accommodate intrepid weather observers and their modern accoutrements. "The technical apparatus [at the stations] will include weather instruments, a hydrogen generator for inflating balloons for upper-air observations, and a reliable radio station," Hubbard envisioned. The latter would be vital. "The marvelously compact and efficient radio instruments built for aircraft may be adapted to a ground installation by the erection of antennae on sectional masts of plywood tubing," and personnel in remote regions would feed "weather facts ... into our domestic teletype circuits at home within an hour of the time of observation."[11]

Radio would also connect these Arctic denizens to civilization down south. "The radio takes the place of the family telephone, with perhaps an hour or so a week of visiting with friends thousands of miles to the south," Hubbard envisaged. In his view, modern methods and equipment removed the barriers to "outfitting and supplying a group of men or even a family for a prolonged stay in very high latitudes." Careful planning, "mixed with a dash of courage," could overcome any obstacles. Like Vilhjalmur Stefansson, Hubbard painted the portrait of a "friendly Arctic," not the bitter, dangerous, perpetually cold realm of polar explorers. The airplane

had shifted the equation. Whereas McClintock had taken twenty-seven "agonizing" months to make a round trip to the magnetic north pole, it was now accomplished in a single day. "Instead of the great adventure which it used to be," Hubbard insisted, "arctic travel has become simply a technical specialty — a trade rather than an art." In his promotional pitch, he claimed that airborne hazards were no more severe in the Arctic than elsewhere during the four months of "good working weather" each year. Coupled with radio and modern diets, he trumpeted that a technological revolution had "completely changed the picture of arctic living. In the past it was a desperate adventure to winter north of the Arctic Circle. Today it is possible to keep in touch with civilization and enjoy most of the usual comforts of home."[12]

Prospects of trans-polar commercial aviation were likely to grow in the postwar world, so Hubbard insisted that an Arctic weather network was required immediately to lay the essential groundwork. Tapping into popular conceptions of frontier progress more generally, he reminded Americans that it would be "putting the cart before the horse to think of the airways first, since weather knowledge must precede the selection of airways, just as geographical knowledge must precede the building of a railroad." It was only logical to select weather stations along potential air routes of the future — like a strategic outpost in Peary Land (along the northern coast of Greenland), lying "almost exactly halfway on the Great-Circle route between the centers of America and Russia." The Russians had already developed a weather station program far beyond anything in North America, boasting "well over 100 observation points above the Arctic Circle, strung along the Siberian coast and on all the outlying islands, even the most northerly Crown Prince Rudolf Island in Franz Joseph Land, 1,000 miles north of the Circle." By contrast, the Americans, Canadians, and Danes could plot "just one weather symbol" in their fifteen-hundred-mile stretch of the circumpolar north. Pilots who visited the Soviet Union during the war noted that their investment in Arctic meteorology was "paying handsome dividends," helping to explain the successes of the Russian armies and air force on the eastern front. The Soviet-style "business of arctic development" was something to emulate.[13]

To do so required a wholesale change in the North American mind-set about the polar region. "We must stop thinking of it as a white hell,"

Hubbard noted. "A measure of courage, perhaps, is required to appreciate the beauty of the arctic, but to those who are not afraid of solitude, nor of themselves, it is very beautiful indeed." Wartime developments in Alaska and Greenland had exposed men to "the real north" and encouraged them to overcome their fears. Consequently, he anticipated few problems recruiting personnel for "the first small network of arctic outposts," which would expand over time to "full-fledged airway-navigation points like lighthouses around the polar sea." Modest initial buildings would soon be relegated to storehouses or workshops, replaced by:

> a new residence with a white picket fence and a red roof.... There will be room for a family or two and a few Eskimo servants. On a near-by hill, the tall towers of the radio will stand as sentinels on the new highways of the air. Some of us will someday look down from the cabin of a transport passing overhead. We may marvel, at first, at the smallness of a single house in the savage expanse of mountains and icefields. In the long night, the lights of the windows will show far against the purple snow — the lights of American progress.

Given this idealistic and racialized depiction — an Arctic suburb sustained by the marvels of modern technology and Indigenous servants— Hubbard concluded authoritatively that the cost would be "very small compared to the value of the results obtained."[14]

Financing this ambitious program as either a private or public initiative would require support. Hubbard needed time and money to interrogate the problems of building and operating weather stations in the High Arctic, so he approached Dr. Karl Taylor Compton of the Massachusetts Institute of Technology (MIT) and Dr. Isaiah Bowman of Johns Hopkins University, who headed up a new Research Board of National Security in the National Academy of Sciences. With half of the Board's membership comprised of Army and Navy personnel, Hubbard could count on military support and "the highest caliber of scientific support" for his studies of specialized techniques, equipment, and supplies to establish and maintain meteorological and scientific research stations in the High Arctic.[15] The most immediate interest was weather data, Hubbard explained, but

a robust Arctic program would also yield scientific insights into areas such as radio propagation, ionospheric conditions, terrestrial magnetism, oceanography, and geology. The Russians demonstrated that they could maintain Arctic stations in the highest latitudes, and northern operations by the US and its allies during the war yielded "valuable practical experiences." Planners acknowledged, however, that "many specialized operational problems [remain] to be solved before a reliable network of arctic stations can safely be undertaken in the western hemisphere."[16]

Hubbard secured a research fellowship at the Massachusetts Institute of Technology (MIT) and set up the ARCTOPS (Arctic Operations) Project focusing on the logistical nightmare of resupplying and operating the stations year-round in treacherous (and still largely unknown) Arctic conditions. He also looked for additional support. In the fall of 1944, he discussed his work with several Canadian members of the newly-formed Arctic Institute of North America (AINA). They responded favourably — a positive indication given that he considered official Canadian approval essential to a project involving Canadian territory — but did not contribute money. Hubbard also approached commercial airlines, emphasizing that polar air routes would soon become a reality, but quickly learned that they were not interested in funding stations with an "over-all value" rather than a specific one that would appeal to private shareholders.[17] Accordingly, he focused his energies that winter on eliciting public support.

As Hubbard's proposal began to work its way through the labyrinth of Washington policy-making, he found strong support in civilian and military corridors. Dr. Francis W. Reichelderfer, the Chief of the US Weather Bureau and one of the first American disciples of the Bergen school of meteorology, had been a quick convert to the plan for fresh Arctic data — and immediately recognized that "it was too extensive and important to be anything but a government project."[18] Through the Joint Meteorological Committee, Reichelderfer shared Hubbard's vision with the Army and Navy. "They will make use of the reports that the Weather Bureau gets of the Arctic," the weather bureau chief later noted when testifying before the US House Committee on Agriculture, "and the Weather Bureau will be sure it is equipped and staffed to give the meteorological information required for all meteorological purposes in this country."[19] The Arctic Subcommittee of the Air Coordinating Committee (comprised of the

Figure 2-2. Dr. Francis W. Reichelderfer laying the cornerstone for a new USWB building in 1940. Courtesy of the Family of Thomas D. Whitely (National Oceanic and Atmospheric Administration).

assistant secretaries of State, War, Navy, and Commerce, and the chair of the Civil Aeronautics Board) set to work exploring how these stations would serve civil and military interests. In the end, they left the project to Hubbard to shepherd through the political fields of Washington. "In view of the problems of reconversion," Hubbard claimed, "the Weather Bureau and Army and Navy had so many problems on their hands that they very largely left to me the attempt to bring this whole program to some sort of accomplishment."[20]

Given that several planned stations would be based on Canadian territory, Colonel Hubbard also took it upon himself as an individual — rather than as an officially-sanctioned US government emissary — to pitch his plans to the Canadians. Armed with a head full of ideas and a stubborn sense of hope, Hubbard entered the Canadian Embassy in Washington on 2 March 1945 (three days before he was due to release from the US military[21]) to meet with ambassador Lester B. Pearson and his first secretary, Escott Reid. Hubbard argued that Canada and the US lagged behind the Russians in meteorology and in northern studies more generally. With the limited weather data available, it was impossible to forecast more than twenty-four hours in advance within a reasonable margin of error. Implementing his Arctic weather station plan would generate precise data

that forecasters could use to produce a pressure map. This was the key to unlocking the Arctic's weather secrets, with continental implications: an improved economy, better civil aviation, and more effective defence. The plan would only cost three to four million dollars for construction, followed by an annual upkeep of about a million dollars. Hubbard concluded his pitch by indicating that the US government soon would approach the Canadians with a formal request to proceed.[22] He wanted to share his plans before word leaked through other channels, which he worried would generate undue Canadian suspicion or worry.

For their part, Pearson and Reid had already learned of Hubbard's plans for weather stations after he had discussed them with the Arctic Institute of North America (AINA) the previous fall. Pearson pointed out to Hubbard that officials in Ottawa would be hesitant to allow the US to build and operate meteorological stations in Canada's Arctic, unless they fell under Canadian control or that of an international organization in which Canada shared authority. It was a fairly innocuous statement, in line with the actions that King's government had taken to reassume control of American wartime activities in the Northwest. In response, Hubbard made an unfortunate mistake. Annoyed by the Canadians' apparent lack of enthusiasm, he suggested that the US still harboured "some doubt … as to the extent of [Canadian] sovereignty over some of these Arctic districts north of Canada."[23] Whether he made his comment with ignorance of the sensitive chord it would strike in the Canadians or intended it as a threat, Hubbard had erred politically.

Raising sovereignty questions was the wrong way to coax the Canadians into accepting his weather station plans.[24] The Canadians quickly circled their wagons. External Affairs questioned several high-ranking officers with the USAAF Arctic, Desert and Tropic Information Center (ADTIC) about the plan, who suggested that officials should take Hubbard's proposals "with — to put it mildly — a certain amount of reserve" and discounted his statements about Canadian sovereignty.[25] "I gather that Hubbard is far from being persona grata to the Arctic experts of that organization who, in fact, managed some months ago to forestall his assignment work with them," foreign service officer R.M. Macdonnell, the secretary to the Canadian section of the Permanent Joint Board on Defence (PJBD), informed Pearson.[26] Meanwhile, Charles Camsell, the deputy minister

of Mines and Resources in Ottawa, played down Hubbard's comments, noting that the US War Department released at least three wartime publications that referred "repeatedly to the islands north of the Canadian mainland as 'the Canadian archipelago.'"[27] In short, Hubbard's views were personal — and not to be misconstrued as an official American position.[28]

Despite raising hackles in Ottawa, Hubbard — now officially a civilian angling for a "good way to make a living"[29] — was making significant headway in Washington to secure political support for his program. He found a willing and powerful ally in Senator Owen Brewster, the conservative Republican from Maine. Hubbard convinced the senator that his weather station program was affordable and that the Arctic was not the impenetrable place that popular mythology held it to be. With Brewster's backing, Hubbard took the lead in drafting a bill in March 1945 that dealt "exclusively with the question of arctic operations, thereby separating it from the broad angles of general Weather Bureau duties and allowing sponsorship of this particular subject." Bill S.765 provided the Chief of the Weather Bureau, under the direction of the Secretary of Commerce, with the authority to develop an Arctic weather network. After working in an explicit statement about international cooperation at Hubbard's suggestion, Brewster introduced the proposed legislation to develop "an international basic meteorological reporting network in the Arctic region of the Western hemisphere" in the Senate.[30] On 29 October 1945 it passed the weather stations bill and referred it to the House of Representatives as a companion bill (H.R. 4611).

With the legislative process underway and his persistence finally paying off, Hubbard continued to work with ARCTOPS scientists and engineers at MIT. The project's approaches and summary report seemed to offer a quintessential example of the burgeoning military-industrial-academic complex in the United States. Past research by explorers or scientists during the First International Polar Year had procured few results compared to the immense resources invested, the ARCTOPS report asserted. "Penetration of the arctic on a reliable and permanent basis only became a practical possibility since the development of the transport airplane." Now armed with "modern methods for transportation, communications, construction and subsistence" that had been developed during the Second World War, "the problems of arctic operation shall become an engineer's

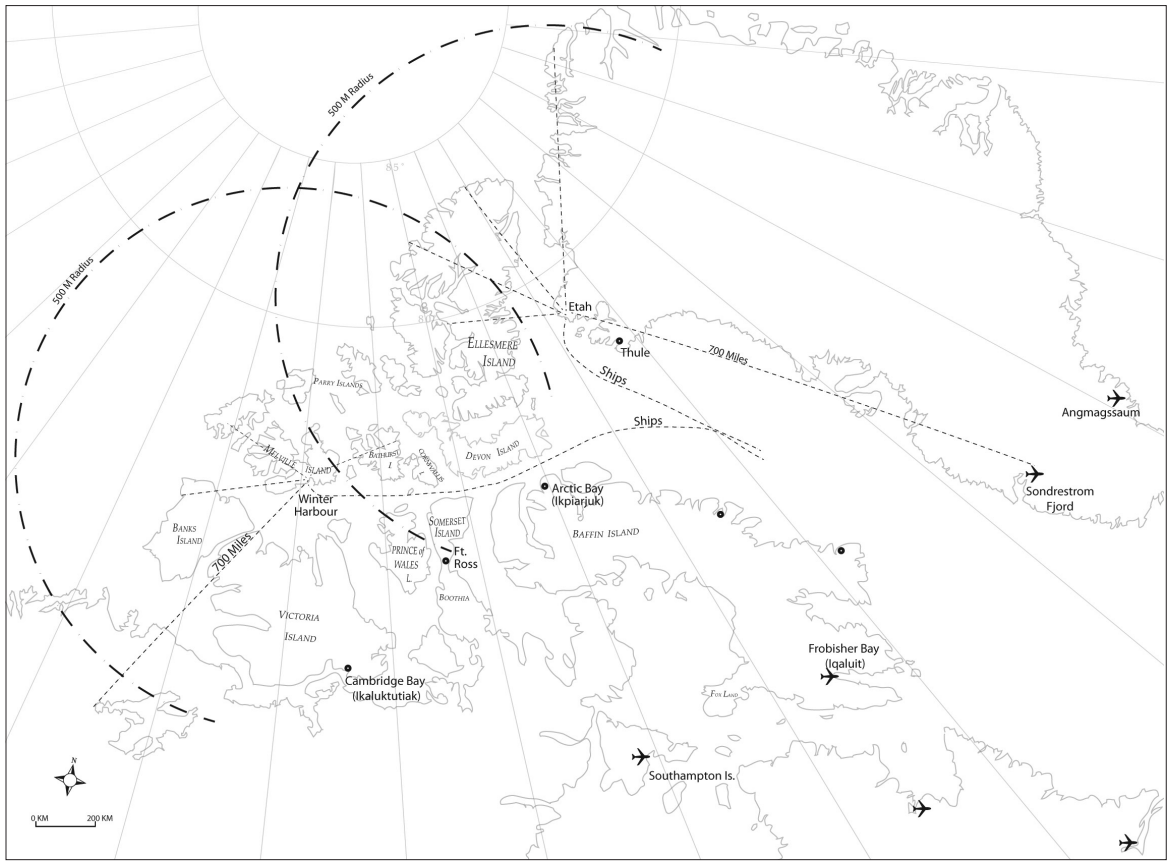

FIGURE 2-3. ARCTOPS project operations map, with Winter Habour as a hub station (c. 1945). Jennifer Arthur-Lackenbauer

specialty instead of an explorer's adventure." The report ignored the importance of place to construction and operations by instead evaluating the needs of an "average station under average conditions." Approximately ten stations, including two transportation hubs which could be reached via ships during the summer, would be established at Winter Harbour, Melville Island, and Etah or Thule, Greenland. Ice-strengthened vessels rather than "big ice breakers" would supply these points. As knowledge of maritime conditions improved, ARCTOPS experts speculated that the vessels might even reach the satellite stations, thus saving the program considerable funds. In the meantime, aircraft would relay supplies from the hubs to the satellite stations. Spring landings by ski, wheeled aircraft on ice strips, as well as summer sea-born landings by flying boats were initially envisioned. No flights were planned during the dark period, although the report contemplated limited flights via moonlight and artificial runway lighting once the stations were fully established.[31]

The ARCTOPS report insisted that the recruitment of suitable American personnel would not be a problem. Remote service had proven "attractive to many men" during the war, and the authors saw little need for any "extensive" training for men to thrive in an Arctic environment. Maintaining morale at the hub stations would "not be difficult," and ARCTOPS officials reported that it might even become "desirable" for women to join men at the stations once operations became routine. By comparison, sustaining morale at the satellite stations would be a challenge during dark periods, but heavy work schedules, recreation, and plentiful and familiar food would help to achieve this goal.[32]

As Hubbard's plans came together in Washington, he was careful to keep the Canadians in the loop. He informed Pearson in April 1945 that the weather station bill was now before Congress and updated Canada's ambassador about ARCTOPS research. Because he was "anxious to maintain an informal connection with responsible Canadian individuals," Hubbard proposed forming an advisory committee for his weather station program — an independent committee without any connection to the State Department.[33] Pearson, however, was unwilling to engage in unofficial diplomacy with Hubbard and advised the American Arctic advocate to contact the Arctic Institute of North America for assistance.[34] The Department of External Affairs kept a sharp eye on the legislation as it crept through

Congress, and insisted that all Canadian "departments should be on the alert to pick up as much information as possible about U.S. intentions."[35] After all, Hubbard and his plan now had powerful backers.

Finding Funding

Although a civilian initiative, the Arctic weather station proposal gained additional support in official Washington circles as the international situation drew strategic attention northward. The wartime alliance between the Western allies and the Soviet Union began to unravel and suspicions grew as soon as the Second World War drew to a close. When Igor Gouzenko, a cipher clerk at the Soviet embassy in Ottawa, defected on 11 September 1945 with evidence of an extensive spy network reaching into the Department of External Affairs, the Allies' atomic program, and the bureaucracies of its senior allies, a discouraged Prime Minister King conceded that "if there is another war, it will come against America by way of Canada from Russia."[36] Although some Canadian analysts urged the West to adopt a more conciliatory approach to the Soviets,[37] most echoed their American counterparts in stressing the growing imperative to bolster continental security. Led by American strategist A.D. de Seversky, defence analysts replaced their Mercator projections with polar projection maps. Looking at the world from the perspective of the North Pole, the United States' proximity to the Soviet Union became strikingly obvious. Given technological advances in long-range strategic bombing during the war, Stefansson's interwar idea of the Arctic becoming the world's "new Mediterranean" no longer seemed far-fetched either commercially or militarily.[38] Was the region becoming North America's Achilles' heel? Although the Soviet Union possessed a small strategic bomber force and no aircraft capable of returning from a bombing mission to the continental US, American military strategists and the press obsessed over the idea of enemy planes sweeping over the Pole to launch raids on the industrial heartland. On 5 December 1945 General Hap Arnold, the retiring Commanding General of the USAAF, declared publicly and unequivocally that the Arctic would be the heart of any new global conflict.[39]

This was unwelcome news for Prime Minister Mackenzie King. After spending millions of dollars to "Canadianize" American installations from the Second World War, he was loath to permit the US military to

re-establish itself in his country's Arctic since he feared that the presence of foreign nationals could be used to undermine Canada's claims to the region. At the time, Allied governments were slashing their defence budgets and demobilizing large portions of their militaries, and there was little agreement about the urgency of mounting new peacetime defences. Although the Soviet Union did not yet possess the atomic bomb or aircraft capable of striking the US heartland and returning to the USSR, a growing number of American and Canadian experts began to consider how their militaries could defend the continent against such a threat. While the Americans pledged to continue protecting North America, the old ABC (America-Britain-Canada) defence agreement from the Second World War was not suitable for countering a surprise conflict over the Arctic rather than Europe. A new continental defence plan and a new Canadian-American agreement were needed. Learning from early wartime oversights, King was not interested in accepting American defence proposals piecemeal and insisted that an umbrella agreement be struck at the highest levels to limit the threat to Canadian sovereignty.

Meanwhile, the House Committee on Agriculture in Washington investigated the weather station bill. "Never before has the security of this Nation been so dependent upon scientific research and development," Representative Margaret Chase Smith (R-Maine), the sponsor of the bill, noted at its 22 January 1946 meeting. "Never before has investment in the field of science been so imperative. Any scientific program for the fuller development of our assets will be incomplete if it does not include Arctic research and study." Reichelderfer, no stranger to exploiting national security imperatives to further his own agenda, told the congressional hearing considering the program's funding that "it is very essential from a defense point of view to have full coverage of reports of weather likely to have a bearing on our theatre of operations." Overall, however, the Weather Bureau chief's testimony emphasized the civilian economic and industrial benefits of the proposed program, which he believed would start with five to six American-built Arctic stations and would stimulate "other countries to do their share by establishing stations under their own flags in their own parts of the Arctic." The economic benefits of the proposed program could exceed a billion dollars each year. An example he gave related to drying raisins, which could be protected from rainfall but this was

expensive and disruptive, and farmers only protected their drying crops when warned of widespread rains in thirty-six-hour forecasts. Reliable forecasting was key. On one occasion, USWB forecasters incorrectly forecast a light rain for Fresno, California. The region's farmers lost $12 million in the ensuing heavy rainfall. Building a network of polar weather stations would improve predictive capacity across North America. "Without the information from the Arctic," Reichelderfer concluded, "we are lacking some of the data necessary to do weather forecasting in a more quantitative and scientific manner."[40] Recognizing that the program involved sites within the territorial limits of other countries, he highlighted the importance of securing their cooperation and permission. Because he enjoyed a close relationship with Canadian Meteorological Division director John Patterson, and in light of the close wartime collaboration between the two countries, the weather bureau chief had "every reason to believe that the Canadians would agree to any reasonable arrangement for us to establish and maintain stations at points that would be of benefit to them but which they cannot establish and maintain under present circumstances."[41]

Hubbard also appeared before the House Committee and offered similarly balanced testimony. Like Reichelderfer, he emphasized the civilian benefits of long-range forecasting for American life, from farming, to construction, to transportation, to merchandising. For an estimated $200,000 per station, he planned to build up capacity from "an absolute minimum establishment in the first year, performing a minimum function," to full operations within a three- or four-year window. He even quoted a supporting letter from the Secretary of the Navy, James Forrestal, suggesting that the proposed stations were "primarily intended to aid in the development of civil and commercial air transportation and, if enacted, would have no direct bearing upon the steps which may be taken by the military services in the interests of national defense."[42]

Hubbard also recognized the imperative of armed forces logistical support. In a detailed January 1946 report, he had outlined possible Arctic operations that spring and summer, providing detailed specifications for buildings, transportation requirements, operational timetables, and personnel. According to his plans, the Weather Bureau would depend upon the Army and Navy for transportation and supplies, and thus required their "full approval" to implement the civilian program. Hubbard's primary

objectives that spring were reconnaissance flights and exploration, establishing a base in the western Arctic (on Banks or Melville Island), and setting up a fuel cache and aviation facilities at Thule. Accordingly, he encouraged US officials to approach Canada and Denmark for approvals as soon as possible — but he recommended that the US should retain responsibility for the entire project. The Canadians would insist on participating for "national prestige," and he envisaged sovereignty guarantees to allay their concerns. Nevertheless, he sought to confine Canada's contribution to a few personnel or bush pilots, given that the US had the practical capabilities to build and operate the stations — and would accrue the greatest benefit from them.[43]

Hubbard's and Reichelderfer's arguments were persuasive. On 12 February 1946 the House of Representatives passed Public Law 296, authorizing the Weather Bureau to "improve the weather forecasting service of the United States and to promote safety and efficiency in civil air navigation to the highest possible degree" by constructing and operating weather stations in cooperation with the meteorological services of other countries.[44] Hubbard's wife recalled:

> The need for the stations was wholly justified, in Charlie's opinion and to those interested in meteorology, by their scientific possibilities. The fact, however, that the so-called defense interest of the U.S. also fitted the project very well was responsible for the relative ease with which the legislation setting up the stations was passed. Also there was no air or sea power on the continent except the U.S. Air Force and the U.S. Navy which had the capacity in planes and ships and men to take care of the transportation for the project. However, the possibility of doing a good job on the stations with a free hand was entirely due to the U.S. Weather Bureau, which, having no previous history in the area and no tables of allowances, requirements, and regulations etc. as have the armed forces, gave Charlie a free hand and also the most solid and substantial support.[45]

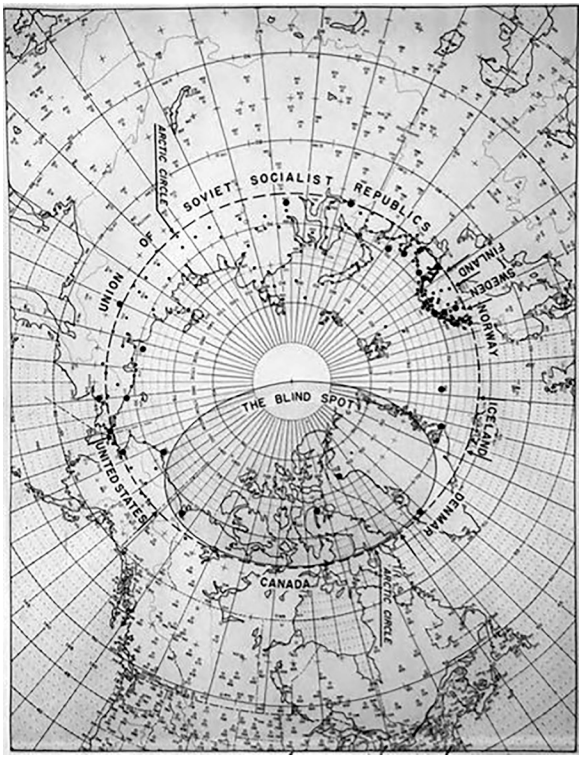

Figure 2-4. This US Weather Bureau map illustrates the higher density of weather stations in southern Canada and the continental United States compared to the "blind spot" in surveillance and scientific data above the North American Arctic Archipelago. USWB, "Station Density—North of 66° N. LAT.," 22 November 1946. LAC, RG 25, vol. 3347, f. 9061-A-40. © Government of Canada. Reproduced with the permission of Library and Archives Canada (2021).

With its special Arctic weather station allocation for the 1946–47 fiscal year in hand, the Weather Bureau formally hired Hubbard as a special consultant beginning in April 1946. He laid out three plans: one to construct all the stations in one year, another over three years, and another over five. He was alarmed when USWB officials chose the first option, and worked feverishly in the spring of 1946 to finalize plans, procure supplies and equipment, and find appropriate personnel.[46] The window would be tight to actually build the stations that summer and the following spring — presuming that the international partners came onboard.

Accordingly, Lewis Clark, the counselor at the US Embassy in Ottawa, officially presented his government's weather station proposal to the Canadian government on 1 May 1946. According to American plans, the first station would be established that summer with a staff of twenty. It would serve as the administrative hub for three smaller, satellite weather

stations set up in the spring and summer of 1947, each with a maximum staff of ten. The memorandum emphasized that the meteorological and economic value of the stations would benefit both governments. Given also the significance of Arctic weather information to continental security, the Americans asked that the proposal be treated with "the utmost concern."[47]

The American proposal also assumed that, while the United States was prepared to build the stations independently, the Canadian government would seek to retain control of these establishments on its territory. In this light, the Americans made two suggestions: that the US establish and assist in maintaining stations under Canadian control, or that Canada construct, operate, and maintain the stations independently. Most importantly, Clark "emphasized that his government wished to work out a programme on a fully cooperative basis and had no thought of interfering in any way with Canadian sovereignty."[48] To finalize details, the Americans suggested a meeting of the key officials from both countries in mid-May. To the Americans, the scope of the project was perfectly reasonable and by insisting that it did not impinge upon sovereignty — Canada's most glaring sensitivity — they anticipated a quick and favourable decision.

Canadian Concerns

A few days after the Americans submitted their official weather station proposal, an unfortunate development rendered some Canadian officials less confident that the US would respect their Arctic claims. General Guy V. Henry, the senior American military member of the PJBD, sent the US Air Coordinating Committee's December report to his Canadian counterpart, General Andrew McNaughton, on 30 April 1946, seeking the old scientist's feedback on its technical suggestions.[49] McNaughton promptly forwarded the thick American report to R.M. Macdonnell, who circulated it around Ottawa on 6 May. It proved to be a bombshell, feeding Canadian paranoia about sovereignty by commenting on potential "undiscovered" islands far north of the Canadian mainland. Although offering a final verdict that strongly emphasized the importance of bilateral cooperation and Canadian consent, the report ruminated on a range of subjects from airbases in Alaska to possible circumpolar flight routes, emphasizing the gap in aviation facilities from Greenland, across the "Canadian islands,"

to Alaska. This piqued Macdonnell's interest, especially the recommendation that American reconnaissance flights look for undiscovered Arctic islands upon which to establish weather stations. The main source of concern related to the "unexplored" area north of Prince Patrick Island and west of Grant Land (Ellesmere) which fell within Canada's "sector" but which might contain undiscovered islands that could serve as platforms for weather stations and communications near the North Pole.[50] Could the US claim any newly-discovered lands and proceed to set up installations on them without Canadian consent?[51] "Arctic problems are coming more and more to the forefront," Macdonnell observed, "and it can be anticipated that within the next few years there will be extensive programmes of northern exploration and development in which the United States will either be participating with Canada or will have been given permission to act independently."[52]

Broader contextual considerations added stress to internal Canadian deliberations on the proposed US weather station program. After several months considering guiding concepts and principles for postwar continental defence, the cabinet met to consider the PJBD's Recommendation 35, which called for close collaboration between the Canadian and American armed forces, including the right of transit and joint manoeuvres, but offered little reassurance that visiting American forces would respect Canadian Arctic sovereignty. A nervous King told his cabinet that he "believed the long range policy of the Americans was to absorb Canada," and that "they were already in one way or another building up military strength in the North of Canada." Based on these fears, they deferred a decision.[53] Concurrently, the Canada-United States Military Co-Operation Committee (MCC) — composed mainly of PJBD members and other military planners — developed a "Basic Security Plan" based on a near-worst case scenario of an existential aerial threat to North America by 1950. To combat this exaggerated threat, the MCC proposed the construction of a vast air warning radar network around much of North America, including a new one stretching along the Arctic coastline from Alaska, across the Northwest Territories, to Newfoundland. Extensive communications networks and meteorological stations would be needed for hundreds of interceptors to reach their targets.[54] Was the civilian weather station program a foot in the door toward whole scale militarization of Canada's North? The

thought of tiny, American-controlled stations popping up in areas that few Canadians had even visited, flying the stars and stripes, raised understandable worries in this broader context.

The Americans had their chance to weigh in when Canadian officials convened a joint conference on May 17 in Ottawa to discuss the weather station proposal. The American contingent included representatives from the US Weather Bureau, Army, Army Air Forces, Navy, and State Department, while their Canadian counterparts came from the Meteorological Service, External Affairs, the service departments, Transport, Mines and Resources, and the Northwest Territories (NWT) Administration. The Americans were excited about the meeting[55] and tried to convince the Canadians to sign on to the plan that they believed was "necessary to improve weather forecasting in the United States, Canada and the North Atlantic area generally for domestic purposes," and that would also support continental security, bringing benefits "to international civil aviation and to the world generally."[56] Hubbard, now officially part of the US Weather Bureau, delivered his usual spiel on the benefits of the stations and implored the Canadians to "strike, while the iron is hot."[57] Having secured $365,000 for the current fiscal year, he hoped to establish an experimental "beach-head" station at Winter Harbour on Melville Island in 1946, followed by stations on Banks Island, Prince Patrick Island, and the west side of Ellesmere or Axel Heiberg Island early the next year. While Canadian officials outside of the meteorological service and the military tended to weigh costs and benefits through a sovereignty lens, Hubbard looked through a budgetary one:

> The American Navy has offered to lay down all supplies and equipment at both Thule and Winter Harbour this summer and the Air Force has agreed to do the necessary flying including the installation and servicing of the advance stations. The Congress Bill authorizing the United States Weather Bureau to seek the co-operation of foreign governments in the establishing of weather stations did not provide any funds. However, there are some funds available in several appropriations during the present fiscal year and for the early part of 1947. After that the future is uncertain. The American authorities

> are anxious to use the available funds now when they exist. This is the reason for the urgency in deciding the issue at this time. The American Navy is ready to operate this season and put in the supplies and the Army Air Force is ready to start at once on reconnaissance flights to determine suitable locations. All supplies for this expedition must be ready by July 1, hence the reason for haste.[58]

The American air force representative at the meeting, Lieutenant Colonel F.W. Hallagan, informed the Canadians that the USAAF commander was so interested in the project that he granted it equivalent priority to Operation Crossroads, the test of atomic weapons at Bikini Atoll. Accordingly, Lewis Clark argued for a quick decision, reminding the Canadians that "the international political situation at the present time is important. Those on the other side of the Arctic are very active. Because of this we can get funds at the present time and later this may not be possible."[59]

The Americans believed the meeting went extremely well. The Canadians had agreed that the proposed weather stations were necessary — even if they needed "a little time to study the matter."[60] Although Hubbard lamented that the Canadians had not approved his scheme right away, given that he had only forty-five days to procure all the necessary equipment, he was certain that consent would be forthcoming. In anticipation, he set about organizing the mission to construct the stations with Air Transport Command, Strategic Air Command, and the Navy, and amassing requisite supplies and construction materials.[61] Support offered by various branches of the Canadian military, which concurred on the stations' relevance to continental defence, also bolstered American optimism.[62]

Canadian civil servants, however, continued to harbour mixed feelings about the proposal. In a closed "Canadian session" immediately following the meeting with the Americans, J.G. Wright, the acting superintendent of the eastern Arctic, worried that "most of these stations were going to areas where our claims on the basis of actual occupation are very weak." Given that the Americans did not accept the sector principle, the NWT Council emphasized that Canadians should operate any permanent facilities on their national soil. "Canada recently spent some $31,000,000

… to extinguish any American rights" in the North, Wright highlighted, so it seemed unwise to contemplate allowing the Americans to operate the weather stations independently on Canadian soil. The US could pay for the project, but Canadians should provide the personnel and operate the stations. For his part, RCAF Group Captain Douglas Bradshaw "hoped that the project would not be turned down on the basis of the sovereignty question," given the acute need for these stations to support air activity "in view of the rather disturbing [international] political situation at the present time." Andrew Thomson of the Meteorological Service also hoped that the project would proceed, even though he doubted Canada could locate sufficient qualified technicians to run the proposed stations.[63]

Sovereignty, Security, and Science

After receiving the US Air Coordinating Committee's December report through PJBD channels, the Canadian Cabinet Defence Committee had commissioned its own study on Arctic sovereignty issues. Written by Vice Chief of the General Staff D.C. Spry, the Canadian report also conflated the weather station proposal with "other US proposals in relation to defence" and suggested that Canada's sovereignty claims in the "Canadian sector" were "at best somewhat tenuous and weak." Overlooking official activities to assert sovereignty in the interwar years, Spry suggested that a lack of effective occupation, settlement, or development weakened Canada's position. "The fact that these claims have not been seriously challenged in the past does not mean that this fortunate situation will continue indefinitely into the future," he opined. Ignoring traditional Inuit hunting on the archipelago, Spry deduced that "these regions represented little but empty space, and their very isolation preserved them from any significant intrusion." Given their newfound strategic importance, he worried that "hitherto unknown islands may be discovered within the Canadian sector by a foreign power, and claim laid to them by right of discovery and primary occupation." Although Spry conceded that the US "tacitly acknowledges Canadian sovereignty over … discovered islands," he stressed that:

> it is of great importance that Canada should carefully safeguard her sovereignty in the Arctic at all points and at all times, lest the acceptance of an initial infringement of her

> sovereignty invalidate her entire claim, and open the way to the intrusion of foreign interests of a nature which might create an ultimate threat to national security. At the same time it should not be forgotten that the Canadian Arctic is an integral part of the North American continent and her exclusive claims to sovereignty must be fitted into the overall requirements of continental security and defence. This Arctic area is considered as vital to the United States as a defence frontier as to Canada, and its military security requires closely coordinated action.[64]

Spry did not advocate closing the Canadian frontier to the Americans. Instead, he recommended allowing access while balancing the twin imperatives of sovereignty and regional security. "The problem is thus seen to devolve into finding a suitable modus operandi," he suggested. "This must permit the granting of essential facilities and rights to the United States without any consequent infringement of Canadian sovereignty of a nature which would give an opening to another power (not associated with Canada in the defence of the North American continent) to make similar demands." The ideal solution — Canada providing all the essential facilities itself — was beyond the country's available resources. The working solution lay in joint projects, where Canada retained full title and control over the facilities while the Americans helped to build, equip, and operate them. In the case of the weather stations, "considerable" US personnel and resources would be necessary to set them up, but Spry pushed for an escalating Canadian contribution until their personnel eventually outnumbered the Americans.[65] Even this relatively "modest" pragmatic solution, Macdonnell cautioned, was "likely to involve heavy expenditures which will increase as the years go by unless the international situation improves."[66]

Balancing sovereignty concerns, effective control, bilateral goodwill, and fiscal constraints proved difficult. Roy Gibson, the deputy commissioner of the NWT, anticipated that the stations would lead to more scientific study than had ever been undertaken in the North American Arctic: magnetic observations, astronomic studies, oceanography, geology, air photography, and other hydrographic and geodetic work. If the Americans

were at the helm, these well-publicized activities would reveal to the world just how active they were in the Canadian Arctic — and how little the Canadians were doing. He also warned that the Americans would not confine their activities to meteorology: they had a habit of squeezing as much information and activity out of their foreign facilities as possible.[67] "This looks like one of those defence (?) projects that looks as though we are getting everything for nothing in the beginning," Gibson remarked; "and then we wake up after awhile to find that the US Senate has turned everything upside down and the US diplomats are back again to ask us to pay for work we could have done better and cheaper ourselves."[68] He suggested that Canadians operate and supply the stations without American involvement, but the meteorological service again rebuked this idealistic notion when it noted that Canada simply did not have enough personnel or equipment to run the stations alone.[69]

Aware of the divergent opinions between Canadian federal departments, the Department of External Affairs contemplated different courses of action in a report for the Cabinet Defence Committee on May 30. The American plan had obvious advantages for Canada: it would supply meteorological information required for civilian aviation and future military exercises in the Far North; it would serve as a base for science in a region about which little was known; and Canadian occupation of these areas would "forestall encroachment by foreign powers." If the United States implemented the program independently it could diminish or endanger Canadian territorial claims, and the huge price tag for Canada to proceed independently made that option unattractive. Simply refusing to cooperate would elicit a strong American backlash and, in a worst-case scenario, might force unilateral American action. Given US budgetary pressures, deferring a decision until a joint planning group could go over plans and set specific parameters would likely delay implementation even though there was "active interest in the area." External Affairs recommended a middle course: give the Americans immediate approval to carry out the program as a joint project involving as many Canadian experts as were available by July 15. Even if this was a "token number" for 1946, it would justify Canadian demands for equal representation the following year. "Such a compromise proposal would not involve Canada in as much expense as the assumption of entire responsibility for the programme, but

would safeguard the Canadian interest," the memo explained. It would also create time for the Department of Transport to find and train skilled weather station personnel, and allow the armed forces to determine how they could best contribute ships and aircraft to "increase Canadian participation without assuming liability for a greater share of the expenses than we could reasonably bear."[70]

The advice from External Affairs also addressed the concerns of Mines and Resources by inserting a series of stipulations designed to protect Canadian interests. Canada would own and control the stations, with the US building them and providing equipment without acquiring any vested interest in or financial claim to the facilities. Furthermore, Canadians would replace American personnel as soon as possible, the two countries would share annual operating costs, and foreign scientists would adhere to Canadian laws. Finally, Canada would retain the right to downscale or shut down the stations if the US withdrew. While Mines and Resources lobbied for a clear American statement that the stations would not affect Canadian sovereignty, External Affairs disagreed. "The United States has repeatedly given the oral assurance that Canadian sovereignty is not, and will not, be questioned because of the establishment of these stations," the legal division noted. By extension, the department deemed it "unwise to insist on a formal assurance of respect for Canadian sovereignty in this area at this time lest it give any indication of doubt on our side of the validity of our claim to any part of the undeveloped lands in the Canadian sector."[71]

Although senior civil servants in Ottawa seemed to reach a consensus to authorize a joint Arctic weather program with the US, it was ultimately a political decision. Unwilling to commit with the prime minister away in England, the Cabinet Defence Committee deferred its decision on 12 June 1946.[72] Hubbard grew increasingly anxious, lest he miss the narrow window of opportunity to begin construction during the short Arctic summer,[73] and he prodded the US government to re-apply pressure through various channels to try to expedite Canadian approval for his plans.[74] The War, Navy, and State Departments reiterated that these civilian stations were necessary for continental security,[75] but Canadian diplomats preached restraint. Pearson asked the War Department to "not press us too hard with urgent requests for quick action in the field of

defence in the North," explaining that these developments might seem small to Americans, but to Canadians were "matters of great importance, strategically and politically."[76] The civilian weather station program was imbricated with this broader defence agenda.

Prime Minister King returned from England on June 19 to face the weather stations issue. The real prospect of a Soviet war of conquest had loomed large in his discussions with key British politicians, who supported a Canadian bilateral defence agreement with the Americans.[77] While King understood the magnitude of the situation, he refused to rush into a decision without taking careful steps to protect his country's interests — and his legacy. While most senior Canadian civil servants urged immediate acceptance of the US weather station proposal, he refused to consider it separately from the broader questions of continental defence. Accordingly, King and his ministers decided at the June 27 cabinet meeting to deny the American request to start the JAWS program that summer,[78] insisting that the Canadians required more time to formulate a coherent continental defence policy and to consider the extent of their country's participation in the weather station project specifically. Their hands would not be forced, and King refused to untangle the civilian weather station program from the panoply of security projects that had implications for Arctic sovereignty.[79]

The Americans had ratcheted up the pressure on the Canadians, but with little desired effect. R.M. Macdonnell informed a disappointed Lewis Clark about the Canadian decision over the telephone, indicating that "it would be necessary to await further progress in joint defence planning, while so far as civil aspects are concerned, there is a need for careful study of Canadian needs and capabilities."[80] Internally, however, R.A.J. (Bob) Phillips (an official with the External Affairs division covering US affairs) reported "indications of developments not calculated to increase Canadian confidence in the intentions of some US officials. Some irresponsible enthusiasts in lower levels in Washington were known to have made ill-considered remarks about the possibility of raising the Stars and Stripes in unoccupied Arctic territory." Canadian officials were well aware that Hubbard was busy collecting vast amounts of material for the project and stockpiling supplies in Boston, even before Canada approved the project.[81] They were also aware that the US Weather Bureau had started to

recruit personnel for the project in early June,[82] and that the recruitment letter made no mention of cooperation with Canada. Recruitment materials even suggested that American personnel would be allowed to bring wives and children with them into the Canadian Arctic as early as 1947.[83]

These activities could be read to suggest American optimism in light of signals from Canadian officials, arrogance in assuming that the Canadians would sign on to their weather station program, or (if one was conspiratorially minded) nefarious intentions that the US would proceed with or without Canadian consent. Reflecting back and defending her husband's reputation, Harriet Hubbard explained his predicament. The US Weather Bureau had to establish stations on foreign lands, but "the rightful owners thereof look with alarm and distaste" on what they perceived to be the "Americans taking for granted that whatever they want to do there is going to be okay." The process presented an intractable dilemma. "No one in the U.S. can deal with a foreign government unless he is entitled to by law. So first you have to pass the law even if it deals with building some stations on a foreign land, before you can talk to the foreign government. But meanwhile they have been looking with alarm at your Congress passing laws about what shall be on their land without consulting them. This is what happened with Canada, and it is only fair to admit that the Canadians were justified though the impasse was inevitable."[84]

For his part, Reichelderfer deemed Canada's refusal to be "extremely serious." He placed "a heavy burden of responsibility on Canada" for embarrassing him and the USAAF in light of the considerable funds they had already invested in preparations. The Canadians seemed to think the project could easily be delayed, but Reichelderfer worried that the planners would never again secure the same fortuitous combination of funds, naval ships, and personnel.[85] The next day, he urged the Secretary of State to encourage the Canadians to reconsider. His friends in the Canadian Meteorological Service had assured him the project would be approved. Was there something the Americans could do to coax the Canadians into accepting the project? Could the State Department ask officials in External Affairs what they wanted out of it? Maybe frank discussions could be held in which the Canadians told the Americans exactly why they disapproved of the project and how the situation could be fixed? Perhaps some further assurances on Canadian sovereignty questions might convince them?[86]

Graham Parsons from the Division of British Commonwealth Affairs in the State Department took a calmer and more reflective view of events. General Dwight D. Eisenhower and the War Department placed strategic emphasis on the Far North, which had precipitated a flood of military requests which went "way beyond anything which Canada has been willing or felt it necessary to do with the United Kingdom [never mind the US] in peacetime." With this in mind, Parsons warned his US colleagues that it was "extremely unwise to force Canada to accept any US activity on Canadian soil in peacetime that is not absolutely indispensable in the view of our highest authorities." If the Americans did not aggressively push the Canadians, he was sure they would sign on for the weather stations program in due course.[87] He preached the virtues of patience. Canadian meteorological and military authorities strongly endorsed the program and "were as disappointed as Dr. Reichelderfer" with the cabinet decision. They needed time to build political support. American urgency stemmed from the availability of funds and transportation, but Embassy staff in Ottawa had heard "through the grapevine" that Canadian Arctic experts remained unconvinced by Hubbard's plan and feared an embarrassing failure. Postponing the whole operation until the following year would provide time to develop more robust plans. Furthermore, the Americans had taken six months to wrap their heads around plans for the operation; the Canadians had barely been given a month to consider their interests.[88] The State Department concluded that Canadian interest lay in the construction of the stations and that their northern neighbours would be better positioned to contribute to the program the following year — with potential relief to the American taxpayer.[89]

Despite overzealous Canadian media coverage in late June alleging an American "ultimatum" on Arctic defence issues,[90] American officials subsequently avoided pressure tactics and hoped to make the best of a disappointing situation. The Canadian government had quashed weather station plans for 1946, but the Canadian Chiefs of Staff still approved US naval operations in northern Canadian territorial waters for that summer and authorized aircraft with US Weather Bureau observers to survey potential Canadian locations for future consideration.[91] This dovetailed with plans for a weather station at Thule, Greenland, which American officials had pitched to Denmark in April. In contrast to the Canadian situation,

the State Department secured Danish permission a month later for the US Weather Bureau to cooperatively manage a civilian installation at Thule, Greenland, under an American official-in-charge. The Danes promised to assign eleven personnel to the station (an equal number to the Americans) as well as housing and supplies, while the US would fund the installation and equipment.[92] With the naval task group proceeding from Boston to Greenland, the USWB deliberated whether it should "gamble" on future Canadian approval and send building materials and stores to Thule, which could later be used in the Canadian Arctic. Canadian officials refused to predict what their government's views might be in the future, and it fell to the American authorities to decide whether to retain their supplies in the US or ship them to Greenland.[93] They took the gamble, and it eventually paid off.

Operation Nanook (1946)

Hubbard, now officially designated Chief of the USWB's Arctic Operations Project, had worked hard to secure essential materiel and logistical support from the US armed services to implement his weather station plans. His 1946 Arctic program, adjusted at the last minute in light of the Canadian decision, now had two principal objectives: establishing a weather station at Thule with Danish participation, and examining local conditions and potential transportation problems associated with proposed weather station sites "in Canadian territory." Strategic Air Command, which fell under the US Army, had procured and delivered most of the necessary weather station supplies in the short time between congressional approval and the departure of the US Navy ships.[94] The Navy provided surface and air transportation through Task Force 68 as part of its Operation Nanook (a designation that Canada would have preferred to avoid because of its military connotation), as well as construction material, equipment, and supplies for the Greenland station and a potential station on a nearby Canadian island that, Hubbard hoped, would be approved in due course. Accordingly, Canada's refusal to permit the construction of a station at Winter Harbour that summer had little practical impact on the Navy's operational plan — including the landing of Marines for training and equipment testing on the Devon Island ice cap.[95]

In early July, a five-ship American naval task force (including two cargo vessels, an aircraft tender with three long-range flying boats, an icebreaker, and an ice-strengthened ship) left Boston for a site on the southern shore of North Star Bay in Wolstenholme Fjord, two miles away from the Greenlandic Inuit village of Thule. No one had informed the community's residents that American forces would call there that summer, prompting confusion when the flotilla arrived in the harbour on 22 July. When the county chairman received formal notification of Danish authority to proceed with the weather station a few days later, Hubbard personally oversaw onshore operations. With "a streak of good weather," the operations at Thule "shifted into high gear" by the end of the month. He recorded:

> The ALCONA and BELTRAMI kept their boats running at full speed from ship to shore, loaded down with Weather Bureau and Army Air Forces equipment which would transform this small piece of Greenland into a modern weather station. Walrus Beach sprang to life with the unfamiliar grunting and roaring of tractors and bulldozers, the cracking and whipping of cranes, and the clanking of heavily loaded Athey wagons. Here we were seeing the start of the first of what was hoped to become a complete chain of well equipped modern weather stations spread out over the whole North American Arctic. Dreary work was in store for the men who would man those stations, but the results of their work, which would be more accurate predictions of weather for the … continent and the Atlantic Ocean, … will contribute a great deal to the better world we hope to have in the future.[96]

While the Navy discharged cargo on the beach, ship personnel and construction crews helped build a camp of Quonset huts and prefabricated barracks. A combined meteorological observatory and radio station soon emerged with auxiliary instrument shelters, storage facilities, and living quarters for US and Danish personnel. The US Army Air Forces helped by airdropping additional supplies and inaugurating air mail service, while the US Army Corps of Engineers built an airstrip to facilitate monthly mail deliveries and the emergency evacuation of personnel. Hubbard

heaped praise on the armed forces, recognizing that the civilian project could not have been completed without military support.[97]

Concurrent to the construction program at Thule, the Americans surveyed the northern islands of the Canadian archipelago for possible weather station sites. The day that the task force arrived in Thule, for example, a naval PBM flying boat completed a reconnaissance of Devon Island, and five days later undertook another one of the Grant Land coastline along northwestern Ellesmere Island. With twenty-four-hour daylight, these air operations proved invaluable for exploring and photographing uncharted areas, as well as for reconnaissance. Near the end of Operation Nanook in early September, aircraft from Thule flew the first reconnaissance of Eureka Sound and found open water. Pans and small fragments of ice, making up less than ten percent of the surface, would present little potential problem to an icebreaker. Furthermore, the landscape surrounding the sound was enticing. Although the land rose to several thousand feet, it was more propitious for a weather station than the mountainous terrain that dominated eastern Ellesmere and Axel Heiberg Island. Nansen Sound had more snow and extreme weather, the rugged Grant Land coast offered no suitable location, and the coast of Axel Heiberg was very flat — and potentially "soft and treacherous" in the summer months.[98] This intelligence, fed back to decision-makers in Washington, would influence the form and pace of development to come.

Maritime operations also tested the feasibility of constructing and maintaining weather stations by sealift. Although the ice pack at the entrance to Robeson Channel blocked the US Coast Guard icebreaker *Northwind*'s quest to reach a highest latitude, it managed to cover 480 miles on its northbound course in a mere three and a half days. Subsequently returning south and charting a westward course into Canada's Arctic Archipelago, the ship completed a successful reconnaissance voyage to Winter Harbour, Melville Island, and through to Cape Hay at the entrance of M'Clure Strait before "old, rugged, and thick" ice floes blocked its progress on September 2.[99] Accordingly, the American observers concluded that "it would have been quite possible, and not unduly hazardous, to have taken a standard cargo vessel to Winter Harbor" that year, and noted that the USWB could reasonably expect to build a weather station on Melville Island in due course. Even if ships could not expect such favourable ice

conditions every year, officials decided that the attractiveness of the land around the harbour for a station and airstrip made it ideal. They recommended building the main station there by sealift the following summer — presuming that Canada would assent to the operation in the coming months.[100]

By all accounts, Operation Nanook was a complete success. "Within a few weeks, an existing airstrip at Thule had been repaired and enlarged, and a new regular weather station with ample storage space had been constructed," historian Matthias Heymann describes.[101] The Danish meteorological team arrived at Thule on September 5 with their housing and supplies. With their American counterparts, they immediately began to take surface and upper air observations and passed these along to the USWB in Washington. The last task force ships departed five days later, and Hubbard returned to Washington ahead of schedule. He was optimistic that, having proven the feasibility of his concept and accommodated the Canadian government's demand for more time to deliberate, Ottawa's approval would soon come. "Canadian observers present during the 1946 activities were in every way cooperative," he concluded, "and supported a hope that satisfactory participation agreements can be found to permit the extension of an arctic weather station network on Canadian territory in the future."[102]

The five Canadian observers who participated in Operation Nanook were less enamoured with the experience than Hubbard intimated. Everyone concurred that the Americans behaved responsibly in carrying out their surveys of the archipelago and adhered carefully to Canadian guidelines,[103] so no one condemned the American activities. They noted, however, that some American military personnel seemed reticent to cooperate fully with their Canadian counterparts. Lieutenant W.E. Widdows of the Royal Canadian Navy (RCN) reported that "the Observers were treated with courtesy, but on the whole it was felt that they were considered merely as passengers. Information was never volunteered, and when given as a result of a direct question, seemed to be with reluctance."[104] Another RCN observer complained that the Americans often refused to discuss operational matters with the Canadians and even forbade the Canadians from entering the navigation bridge. The Americans

considered the observers, who acted as the eyes and ears of the Canadian government, to be "very much in the way."[105]

Compromise and Cooperation

The political climate in Canada remained tepid, and sensationalist media coverage did not help the situation. Leaks from a senior Canadian official led journalist Kenneth Wilson to publish an article on July 20 in the *Financial Post* declaring: "Ottawa Scotches U.S. Plan to Man Weather Bases in Canadian Arctic." Referencing "two particular sources" of inexorable American pressure to build up the "defensive machinery of the continent" — officials promoting "a big chain of weather bases in the Arctic" and "U.S. army and naval officials who view with alarm the fact that there is presently no effective defense of their northern boundary" — Wilson linked the weather station program with an "Atomic Age 'Maginot Line'" that the US allegedly desired to stretch across the Canadian Arctic. A few weeks earlier, the reporter had warned Canadians that the government had received "a virulent ultimatum from the United States, calling on Canada to fortify her northern frontier" through a series of air bases that "would mean that Canada, in effect, abdicated sovereignty" in the region. After bringing this into public light, he noted that "apparently the government decided it would 'take no chances' on this U.S.-sponsored [weather station] project." Nevertheless, "behind this swift and decisive action" Wilson discerned "a disturbing pattern of U.S. zeal and Canadian laxity in respect of northern and Arctic development." While Canada refused to fund meteorological activities in its Arctic because of "indifferent interest and no imaginative leadership at higher Canadian levels," Wilson asserted that the Americans willingly "pour in untold amounts of money and scientific brains and equipment for work like this — irrespective of national boundaries or the 'sovereignty principle.'" Because the US refused to accept Canada's "sector principle," could it really be trusted to respect Arctic "territories claimed by Canada"?[106] An accompanying editorial urged Canada to take independent action. In light of the "very considerable pressures … on Canada by the United States" for Arctic defence projects, it concluded that "the moral is clear: Canada must quickly get a policy of her own for developing the North or someone else may insist on doing it for us."[107] While intended to stimulate Canadian action, these

articles (and others in *Maclean's* and various Canadian newspapers) raised worries in Washington that certain "interests" were looking to sabotage the Canadian-American defence relationship as a whole.[108]

Through the fall of 1946, the Americans attempted to assuage Canadian concerns. The PJBD, for example, redrafted its 35th Recommendation to affirm that both countries retained the right to supervise all military projects undertaken within their territory, and denied that these activities would compromise each other's sovereignty.[109] For its part, the USWB reaffirmed that its interest was in reliable weather data — not in controlling stations in the Canadian Arctic. "Our primary purpose in planning the program is to obtain the daily meteorological reports that are essential to our forecasting services in this country," Reichelderfer explained to Parsons in the State Department in early September. "It makes little difference to us as to the source of the reports that if they are adequate as to areal [*sic*] coverage, contents, and regularity." In Reichelderfer's eyes, the nationality of the observers procuring the data was immaterial — his bureau's new proposal officially confirmed that it would be satisfied if the Canadian government operated the stations. The enabling legislation authorized the USWB to "promote cooperation of other countries" interested in an Arctic weather network, and its plans for 1947 could accommodate Canadian involvement. The Canadian Meteorological Service wanted to cooperate in the program, and Reichelderfer suggested that securing these civil and scientific goals would be more easily achieved if the "emphasis on military aspects" of the program was discontinued.[110] The State Department duly communicated his message to the Canadians, including an offer to travel to Ottawa to initiate technical discussions, and the Canadian Interdepartmental Committee on Meteorology reopened the weather station file for its careful consideration.[111]

The State Department, keen to smooth out any ruffled Canadian feathers, immediately elicited a revised plan from Hubbard and Reichelderfer. Hubbard's new multi-year proposal updated his earlier pitch: establish stations at Eureka Sound in the spring of 1947 and at Winter Harbour that summer, and select exact locations for stations at Banks Island and Borden Island or Isachsen that would be built the following spring. Earlier proposals had stated that the US government would prefer to establish, operate, and maintain the stations themselves. The new plan explicitly welcomed

Canadian participation, envisaging a joint project from the onset and reinforcing that the USWB was "interested only in the procurement of data" and was "not concerned with the nationality of the observers." The fact that the Weather Bureau had already amassed 90% of the materials needed to install and operate the stations, as well as the capability of US Navy and Army icebreakers, cargo ships, and aircraft to provide economical transportation and logistical support, meant that Canada's initial contribution could be "token" and limited to providing some station staff. It could gradually assume responsibility for the stations at a later date. Armed with experience gleaned from Thule and the reconnaissance of Canadian territory the previous summer, Reichelderfer felt confident that these new plans were both reliable and saleable to his counterparts in Ottawa.[112]

The revised Weather Bureau proposal emphasized the civilian and scientific objectives of the weather stations, not as a disingenuous form of "civilian cover" but as an honest reflection of the program's intent. For the past year, the defence and civilian aspects of the project had been conflated (particularly in Canadian circles), creating confusion and suspicion. Reichelderfer admitted that the weather and scientific data collected by the proposed stations had "both civilian and military" value, but he insisted that the "civilian and scientific nature of our objectives" should be emphasized.[113] The military's interest in the stations justified Army Air Forces and Navy "exercises" to establish the stations, but Hubbard and Reichelderfer clarified that the actual civilian operation of the weather stations was distinct from the military's transportation and logistical support. "Canada may display a desire to combine her military programs with the proposed civilian weather station project," Hubbard acknowledged, but he believed that the "United States should continue to urge a separation of the Civilian [*sic*] and military planning, including physical separation of contemplated facilities in so far as practicable."[114]

The Canadian Department of Transport shared a similar view. It lamented the lack of knowledge about visibility, fog formation, cloud cover, icing hazards, frost formation, and atmospheric circulation in the Canadian Arctic. What limited data it had on High Arctic conditions were derived largely from reports by historic expeditions, most of which had occurred during the summer months. Accordingly, the Interdepartmental Committee on Meteorology recommended in October that the two

countries should work together to set up three large stations in the summer of 1947 and smaller satellite stations in due course. Recognizing that the Americans had already amassed a lot of supplies for the program, including tractors, clothing, food, and all items needed to maintain the stations for fifteen months, these technical and subject matter experts also emphasized that cooperation with the Americans seemed both obvious and desirable.[115] R.M. Macdonnell told T.A. Stone, the Chargé d'Affaires at the Canadian Embassy in Washington, that many Canadian officials were now leaning towards a joint Canadian-American program and would make their decision soon,[116] and Stone relayed this information to an enthusiastic Graham Parsons at the State Department.[117]

Given the Canadian prime minister's earlier reticence, translating the weather station plans into reality required bilateral agreement at the highest political levels.[118] Despite Hubbard's and Reichelderfer's efforts to dissuade Ottawa officials from perceiving the proposed High Arctic stations as a military endeavour, King continued to view the program through a continental defence lens.[119] What Canada needed from the Americans was a guarantee that they would not try to protect the northern approaches by leaving Canada out of the picture. King's message to the cabinet, once again, was to buy time and proceed with caution. It was not a choice between security or sovereignty. The solution had to offer both.

The prime minister's delay tactics worked. US Secretary of State Dean Acheson pressured President Harry S. Truman to bring King onto the same page about continental defence during a meeting at the White House on 28 October 1946, but the president limited himself to specific issues such as expanding the American presence at Goose Bay and the imperative of establishing weather stations on the archipelago, rather than discussing a basic defence plan. King refused to budge, only agreeing with Truman's suggestion for further high-level diplomatic discussions. The next day, the White House transmitted a message summarizing these points and encouraging Canada to approve the PJBD's re-drafted 35th Recommendation (which had been renumbered to become the 36th Recommendation). In response, the cabinet extended an "olive branch" to their American counterparts by agreeing to do so.[120] This decision laid the groundwork for landmark meetings on 16 and 17 December 1946, when senior Canadian and American officials met at the Château Laurier hotel immediately east

Figure 2-5. Prime Minister Mackenzie King (left) and United States President Harry S. Truman (right) at the White House on 28 October 1946. LAC, MIKAN 3193184.

of Parliament Hill in Ottawa. The meeting was kept as secret as possible, with military officials arriving at the hotel in their civilian clothes to avoid attracting attention. Here the allies hashed out a deal on bilateral defence cooperation that satisfied American security concerns without sacrificing Canada's national interests. The Americans conducted the meeting in a friendly and informal manner, having sent senior policy-makers for the occasion (including Russian expert George Kennan).[121] Canadian officials observed that the Americans did not attempt to "present demands or to insist on certain things being done,"[122] but made a reasonable case and allowed their Canadian counterparts to draw their own conclusions. "Far from being in an excitable or panicky frame of mind, the Americans had shown themselves very cool, level headed and realistic," a Canadian report noted.[123]

At this high-level diplomatic meeting (which did not include representatives from the USWB or DoT), participants framed the weather stations within broad discussions of continental defence. Here the Canadians learned that the Americans did not want to dash into grandiose air defence schemes, nor were they interested in questioning Canadian sovereignty in the Arctic. Canadian officials, still worried that increased military activity in the Arctic would be perceived by Canadian voters — and Soviet officials — as unnecessarily "provocative," suggested that these political problems could be avoided by, at least initially, developing Arctic defence projects under a "civilian 'cover.'"[124] Although correctly identifying the Department of Transport as the Canadian agency responsible for the weather stations (not the military), and seeing nothing harmful about the collection of meteorological data, Ottawa mandarins continued to lump the civilian project in with defence ones. The joint civilian weather stations were thus associated with a perceived need to minimize defence objectives and "stress the civil benefits that can be anticipated from improving our knowledge of northern conditions and making the resources of those regions more available for general use."[125]

The Americans responded deftly to what must have seemed a bizarre request, given that the joint weather station plan was led by the civilian weather bureau. Accordingly, they framed Ottawa's concerns as "primarily a Canadian problem," but conceded "that such 'cover' could probably be provided in certain cases."[126] The High Arctic weather stations were a convenient way to placate Canadian concerns, given that Hubbard and Reichelderfer had largely justified their proposed program on its civil benefits. The continental defence rationale brought needed support for their plans, but did not shape them. After all, the data would be shared internationally — including with the Russians. As long as the Canadian government consented to the construction of the weather stations and several modest defence projects in the Arctic, the Americans expressed little concern whether Canadian cabinet ministers believed that USWB and DoT management of the weather stations was a ruse to conceal "military" intentions. They knew better.

By all accounts, representatives from both countries emerged from the December meeting satisfied. "The smoke has cleared away from our recent meeting here and the scene is much clearer," American ambassador

Ray Atherton wrote to Jack Hickerson. On the American side, "those who did not know Canada enlarged their horizon a great deal and will be more cooperative team-mates in the future." Pearson believed that this quieter tempo was the outcome of six months of stalling on the Canadian side.[127] King gloated that "the Americans had come around to his own way of thinking," and the US was pleased to have Canada "sign on" to the general principle of joint defence cooperation, especially in the North.[128] By respecting Canadian insecurities about sovereignty and security, the Americans made the price of defence cooperation significantly easier to bear. Given the threshold that King had set for re-evaluating the Americans' weather station proposal, this bilateral breakthrough laid the essential groundwork for much-anticipated progress.

Reaching an Agreement

Substantive developments flowed quickly from this general agreement. On 16 January 1947, the Canadian Cabinet Defence Committee approved the final version of PJBD Recommendation 36, which laid out the basic principles for defence cooperation and provided explicit assurance that the United States did not seek to undermine Canada's sovereignty in the Arctic (though it also avoided affirming or rejecting the sector principle). Instead, it pragmatically pledged that all defence projects would remain under the control of the host country, no permanent rights would be granted to visiting forces, and both countries would study each project individually and approve all public statements about the defence projects.[129] These "safeguarding principles" were "immaterial from the standpoint of United States interests" and in no way devalued the recommendation from an American perspective.[130] King announced the recommendation in Parliament the next month and most journalists, convinced that these principles of bilateral defence cooperation protected Canada's interests, responded favourably.[131]

These principles fit with the substance of the revised USWB weather station proposal drafted the previous fall, which the Canadian government had now had ample time to scrutinize. Accordingly, after all the fuss and delay, the cabinet approved the Joint Arctic Weather Station project with little fanfare on January 28 — and proposed a more ambitious program than the Americans had contemplated.[132] On February 13, Lester

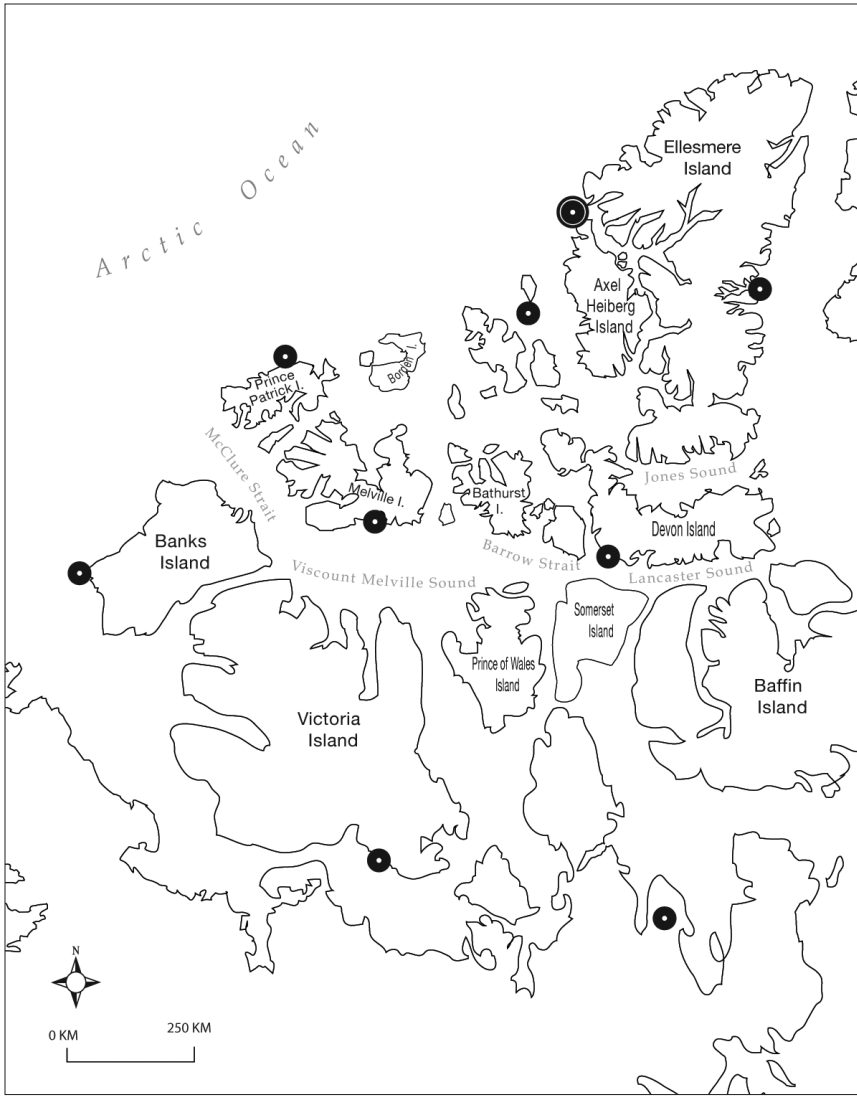

Figure 2-6. Canada's Proposed Weather Station Plan, 1946. It envisioned the establishment of stations at Winter Harbour, Cape Kellett, and Grant Land in 1947; Barrow Strait, Cambridge Bay, Prince Patrick Island, or Borden Island in 1948; and the Sverdrup Islands, Simpson Peninsula, and Bache Peninsula in 1949. Jennifer Arthur-Lackenbauer

Pearson informed US Ambassador Atherton that Canadian officials wanted to establish nine stations across the central and western Arctic over the next three years (see figure 2-6). "In carrying out this programme the Canadian Government wishes to work in the closest possible collaboration with the United States Government," Pearson explained, and he invited the Americans to "share in the establishment and maintenance" — a clever twist to allow Ottawa to claim the program as its own. The Canadians proposed that each country provide half the personnel for each station under a Canadian officer-in-charge, with the Americans retaining no rights to any permanent installations. To sort out the final details, the Canadian government proposed a meeting of technical experts a week later.[133] The USWB, which had been pushing for months for such a meeting, agreed immediately.

Historian David Bercuson observed that, by the end of 1947, Canada had established the principle of its Arctic sovereignty and the US reaffirmed this principle each time a joint defence-related project was initiated by seeking permission for operations in Canada. "Through trial and error, Canada established the policies and procedures by which it safeguarded its interests and protected its sovereignty while still satisfying the defense needs of its superpower partner," he suggested. "In effect, Canadian control over the far north was systematically challenged for the first time since Canada had acquired the region, and, in effect, Canada's claim to the far north emerged stronger than ever. Given the stakes involved, it was a remarkable success."[134]

While Bercuson is correct in highlighting Canada's successful defence of its Arctic interests, his intimation that the United States had "systematically challenged" its control over the region is open to debate. This was a perception held by certain "northern nationalists," who nervously looked at continental defence projects as a threat to Canada's Arctic sovereignty and persistently worried about American intentions.[135] As the case of JAWS reveals, these proved to be misperceptions with strong political implications. While many Canadian civil servants and senior military officers were prepared to support the US Weather Bureau's Arctic weather station plan, with additional conditions to safeguard Canada's national interests, the prime minister rejected their advice in mid-1946 and delayed the project, refusing to consider a civilian weather station

proposal separate from broader questions about bilateral defence relations. Canadian historians have viewed the weather station debate as a prime example of US defence interests provoking Canadian sovereignty concerns. However, this interpretation downplays Charles Hubbard's vision and the US Weather Bureau's driving role in the American plans and, mirroring Prime Minister King's view, conflates civilian and military interests.

Several Canadian historians have overlooked or dismissed as a sham the civilian justification for the Joint Arctic Weather Station program, asserting that it was a "military project" from the onset.[136] To push through his agenda, Hubbard certainly had to secure the support of the US armed services. He also conceded, in early 1946, that "it seems probable that the considerations of national security which lie behind the authorization for an Arctic weather network are of more immediate concern than the procurement of meteorological data for civilian purposes."[137] But the continental defence agenda was not the primary conceptual driver for Hubbard's plans — however important it became for the civilian weather bureau in securing budgetary and logistical support. The US Army and Navy were involved in construction and resupply, but the actual operation of the stations — which generated comparatively little sovereignty concern and thus has not attracted the interest of Canadian scholars — was unabashedly civilian. Ironically, what Prime Minister King ultimately felt that he needed to pitch under "civilian cover" did not require such "cover" at all in American eyes. It *was* a civilian program at its core, albeit one that also had practical benefits for defence.

When unveiling the plan to the public in early 1947, Pearson suggested that it was "eminently desirable to emphasize the routine and civilian aspects of this extension of our weather station facilities." Accordingly, he recommended that Clarence Decatur Howe, the Minister of Trade and Commerce, issue the news release.[138] Thus, despite Prime Minister King's unwillingness to consider the Arctic weather station program outside of continental defence deliberations over the preceding six months, Canadian public messaging ultimately aligned with and emphasized the USWB's continuous message: that this was a civilian endeavour. Accordingly, Howe stood up in the House of Commons on March 4 to announce that nine weather stations would be built over the next three years in the Canadian archipelago and would operate for at least five years — enough

time to assess the joint program's value. Noting that Canada's climate and weather are affected more by the Arctic than any other point on the compass, Howe described the beneficial role weather stations would play in agriculture, lumber, transportation, and the opening of transpolar air routes. Since the Soviet Union boasted many weather stations on its side of the Arctic, Howe indicated Canada's desire to work with the USSR and the other polar countries in exchanging meteorological data. This message — which reinforced the vision articulated by Hubbard, Reichelderfer, and Wilkins — affirmed that this civilian program might actually promote circumpolar cooperation.[139] Finally, Howe commented on how important the stations would be for US long-range forecasting. Under this pretext, the Americans would be permitted to assist in the construction of the stations, which would always remain under Canadian control. "Until sufficient technically qualified Canadian-trained personnel are available," Howe explained, the United States would provide "technical personnel" to work alongside Canadians.[140] Having thus appropriated the American-conceived project as an ostensibly Canadian-led joint initiative, at least for political messaging, the Canadians were clearly on board.

It had been a long road, but prolonged bilateral negotiations had finally paid off. Although Hubbard and Reichelderfer had warned their Canadian colleagues that blocking weather station plans for 1946 (when they had confirmed resources) could spoil the entire program, their fears were misplaced. The United States ultimately funded a multi-year development plan, and the initial disappointment surrounding the Canadian delay gave way to improved plans and greater efficiencies. "We had such a head of steam at the time that it seemed like a crushing blow when the Canadians, by wishing to go more slowly, limited the first summer's operations to landing supplies in Greenland … and to exploration work in northern waters," Harriet Hubbard recalled. The delay allowed the Weather Bureau to draw upon practical lessons learned rather than the "experimental conclusions" reached through the ARCTOPS program at MIT. "As a result of having more time, every succeeding station had been better engineered and better built than the ones preceding."[141] Hubbard remained at the helm and, by early 1947, had both the resources and the Canadian authorization to implement his vision.