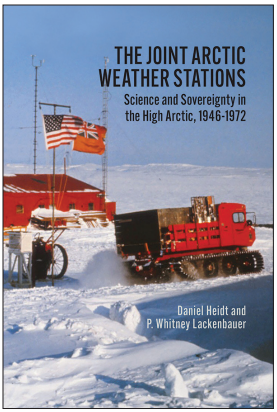

THE JOINT ARCTIC WEATHER STATIONS: SCIENCE AND SOVEREIGNTY IN THE HIGH ARCTIC, 1946–1972

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The Seasonal Cycle

> Although surprising changes have taken place in man's methods of adapting himself to the Arctic environment, the changes which have occurred in the Arctic itself in the past few hundred years are insignificant. Polar bears may still be seen roaming the icy wastes near the weather stations. The long winter night and corresponding summer daylight are still as fascinating to Arctic visitors as in years past. Accounts of weather phenomena, storms, blowing snow, low temperatures and so on reported in the journals of the 19th century explorers would apply equally well today. The scenery still consists of snow-covered wastes in winter and bleak looking terrain in summer.
>
> R.W. (Bill) Rae (c. 1958)[1]

"The High Arctic conjures thoughts of bleak, frozen, snow-covered landscapes, or wind-driven snow over endless ice," D.W. Buss of the Atmospheric Environment Service (AES) wrote in the 1971 edition of the AES *Bulletin*.[2] From October to April, average monthly temperatures in the region stayed well below freezing. "If we define winter as the period from the time that the snow first stays on the ground until the time that the ground is again snow-free, winter lasts from the beginning of September to the end of June in the Arctic Archipelago," Rae noted. "This leaves only the months of July and August for spring, summer, and fall."[3] The ice-filled polar sea ensured

that the air remained cool even during July, the warmest month, when the temperature usually averaged 40°F (4.4°C).

The seasonal cycle of the Joint Arctic Weather Station program rotated through four seasons that bore little resemblance to their southern counterparts. The mean annual temperature in Toronto was 45°F (7°C); in Eureka it was -3°F (-19°C). "The criteria used for defining the seasons in temperate latitudes are not entirely satisfactory for arctic regions," geographer Moira Dunbar and Arctic navigator Keith R. Greenaway explained. "Reports by arctic travellers in the past reveal a wide difference of opinion as to the length of the seasons and even as to their number, ranging from the idea, still current among many laymen, of one season of eternal snow, to the now more generally accepted pattern of four seasons."[4] Nevertheless, "humans have always been obliged to accommodate to the region's distinctive seasonal cycles," historian Lyle Dick observes. "Each season presents its own challenges and opportunities."[5]

Few histories of the Arctic interrogate the ways that seasonal cycles shaped non-Indigenous life in the North. Historians Kevin Lynch and Andrew Stuhl suggest that analyzing environments invites the question: "what time is this place?"[6] Framing the history of the JAWS program around the archipelago's four seasons, and particularly how these shaped transportation and communications given the technologies available in the 1940s to 1970s, reveals a tension between modern aspirations and an acceptance of place. JAWS personnel and the southern planners endeavoured to use transportation technologies to shorten or eliminate the stations' seasonal isolation. Sunlight, for example, was sometimes more important than weather, as station personnel worked to shorten winter from both ends. Their efforts were largely successful, but forging sturdy southern connections required many more years than anticipated and always suffered irregularities that a simple winter/non-winter dichotomy does not capture. Focusing on the seasonal cycle also reveals a second side to this lived experience. JAWS personnel, who lived at the stations year-round, internalized their remoteness and learned to accept and adapt their behaviours, ultimately accepting seasonal environmental rhythms to make the stations thrive.

Emerging from Winter

JAWS personnel emerged from the stations when the sun's glow peaked over the horizon for the first time in late February or early March, bringing twilight and portending the end of the dark season. Even though the "spring sun" was only visible for part of the day, and temperatures hardly exceeded winter lows, personnel began preparing for the approaching airlift — the key activity that would reconnect the stations with the outside world.[7]

The initial rush to construct airstrips near the stations had ended badly. By 1950, most were in poor shape, forcing several satellite stations to temporarily revert to constructing seasonal airstrips on the ice — a lengthy and arduous task. In 1952 at Isachsen, for example, the preparatory work began in mid-February when station personnel started monitoring the ice's thickness and structural integrity, noting the location, size, and type of snowdrifts located on or near the previous year's strip, and proposing design improvements. The snowdrifts, which could rise to be over ten feet tall, were critical to estimating when to begin clearing the strip and how best to keep the area around it free of new drifts. After making "test cuts" with a tractor and observing any resulting drifts, personnel at Isachsen proceeded with constructing the ice strip while maintaining the station's meteorological observations — a work schedule that stretched the station's human resources to the limit. The station diarist recorded on 13 March 1952:

> A rough plan of operations for the strip-clearing period was set up this evening and met with general approval. Bill [mechanic] and Gordon [met tech] are to devote all their time to tractor driving, weather permitting, with Jim [cook], John [radio operator] and Toney [ExO] providing relief. Steve [OIC] and Toney will make all raob and pibal observations, Steve taking over all the gas-making to allow Toney to be at the strip during the afternoon. Steve will make Gordon's morning raobs, and Toney the evening ones, with the free one of the pair doing the pibal for that time. John will be free for a good part of the afternoon for relief work, and Jim can spend

Figure 7-1. Clearing an ice strip at Resolute Bay, 1950. Alan Faller Collection.

> some of his mornings at the strip. In this way the two steady drivers ought to have time enough for warm-up periods in the strip shack, while the relief drivers will be able to accomplish their regular chores as well.[8]

The station began operating according to this temporary re-division of labour the following week. Depending on the conditions and mechanical problems, the ice strip work required one or two weeks to complete. During the spring of 1952, operators at Isachsen put on several layers of the heaviest clothes they owned before climbing into the tractors' open cabs to work in temperatures that rarely rose above -20°F (-29°C). Tractor operators minimized their misery by driving in patterns that put their backs to the wind while scraping the surface. The work was tough; higher drifts "repeatedly" stopped the tractors and it took multiple passes to clear them. To worsen matters, hardly a day went by without something breaking on one of the snow-moving vehicles, and crews had to frequently

Figure 7-2. Transferring personnel at Alert with the "sacred cow" weasel tractor, 1954 or 1955. Frank Adams family collection.

detour back to the station to make repairs. This work continued each day until the clearing of a strip was complete on 25 March. The team then hitched scrapers, graders, and rollers to their tractors and smoothed out the runway and aircraft parking area before marking the end of the runway with punctured drums. They spent the next week preparing the station for the arrival of the first aircraft, which included preparing guest accommodations for incoming seasonal workers and scientific teams.[9] Land strips, when properly constructed, were much more reliable than ice strips,[10] and when they were finally available year-round at the satellite stations in the early 1960s, station personnel had to clear them of snow in April before airstrip ("strip") mechanics arrived to maintain these surfaces during the spring, summer, and fall.[11]

Spring

Spring in the Arctic is "wonderful," Norwegian meteorologist and oceanographer Harald Ulrik Sverdrup noted in 1935. "At no other time are the

colours of the sky as beautiful as they are in spring, nor the snow a more splendid white."[12] According to Moira Dunbar and Keith Greenaway, spring on the archipelago began in May when increasingly frequent but less intense frontal activity brought warmer temperatures. The consequent rise in cloud coverage and snowfall attained a secondary maximum in some parts of the Arctic.[13] Rather than wait for these less-than-ideal flight conditions to arrive, the USAF and RCAF undertook the so-called "spring" airlift at the end of the winter in April or early May. This period was the "logical time of the year" for the operation because the skies were "usually clear" and the winds were "light."[14] It also offered some daylight, temperatures averaged between -20°F (-29°C) and 15°F (-9°C), and melting did not yet compromise ice and land strips.[15]

Air transport was needed to bring everything (except water) to the satellite stations during the spring. Materials essential to operations and everyday life — everything "from radio parts through meteorological balloons, phonograph records, extra clothing, tractor parts, diesel fuel oil, orange juice, road scrapers, magazines, sacked coal, flour, ink, lumber, bulldozers, cement, breakfast cereals, stove parts, electric generating sets, gasoline, powdered milk, earth-moving equipment"[16] — were ordered up to two years in advance, then transported by sea to Resolute and Thule the year before they were sent to the satellite stations. The aerial operation to move these goods to their final satellite station destinations typically required most of April.[17] Resolute, the hub station, boasted a year-round airstrip that the RCAF operated and maintained from 1950–64 before the Civil Aviation Branch of DoT took it over. It served as the jumping-off point for aerial resupply of Isachsen, Mould Bay, and Eureka,[18] with the US Air Force base at Thule providing additional support for the resupply of Alert (which was subsequently dubbed Operation Boxtop after the RCAF "Canadianized" it in 1956).[19]

During the spring resupply, the OIC oversaw a satellite station's overall operations (including the meteorological program) while the ExO supervised resupply activities. When an aircraft landed at the satellite stations, waiting station personnel unloaded the cargo as quickly as possible. This unloading took precedence over storage, and all non-perishable goods were left in semi-organized groupings to be systematically stowed in the coming weeks and months.[20] Unlike Eureka and Resolute, which received

Figure 7-3. The RCAF station at Resolute Bay in 1964. Jim Jung Collection.

their bulk fuel during the annual summer sealift, Mould Bay, Isachsen, and Alert received fuel via spring airlift in hundreds of 45-gallon drums during the 1950s. (The following decade, C-130 Hercules aircraft used rubber bladders and pumps to move the fuel from the fuel farms at Resolute and Thule to large permanent tanks installed at the satellite stations.)

The spring airlift also brought replacement personnel to relieve men who had overwintered. Some new arrivals did not like what they saw. When he was working at Alert in 1969, for example, David Weston recalled one occasion when station personnel unloaded an aircraft, met the individual who would replace an outgoing colleague, refuelled the aircraft, and watched it depart before driving to the station to unpack and read their long-awaited mail. Only when everyone re-congregated at dinner did the OIC notice that the new addition to the station team was nowhere to be found. After scouring the base and airfield, the station radioed the southbound aircraft and learned that the replacement was still on board. "The guy got off the plane, took one look around at the barren landscape, said 'this is where I came to?, not for me man,' got back on the

FIGURE 7-4. Transporting plywood and luggage at the same time from aircraft at the "Mould Bay International Airport" using a tractor and sledges, 1956 or 1957. Jim Jung Collection.

plane and left," Weston surmised.[21] On the other hand, station personnel who had overwintered were eager to leave. In one case, John Gilbert (Resolute 1956, Eureka 1957–58) arrived and watched as his predecessor immediately boarded the aircraft and strapped in, even though the plane was not scheduled to depart for several hours.[22]

Personnel slated to return to the south typically remained for up to a week to familiarize their replacements with the rigours of station life and work. "Where this is not possible, the new men are bewildered by the new problems which they face at these remote stations," Inspector George Rabbitt wrote in the autumn of 1953.[23] Whatever the case, new arrivals had plenty to learn. A radio operator, for example, needed to inspect his equipment and gather "verbal history from the old-time members of the station" before he would be adequately prepared to diagnose future equipment failures.[24] Radio operators were also responsible for conducting some of each satellite station's surface observations, and the USWB's failure to train these men in basic techniques before they headed north necessitated

a crash course on-site at the stations. Bob Pearson recalled having to "pick it up in a hurry" during two or three hours of meteorological training after arriving at Eureka in 1949.[25]

The need for on-the-job training continued through the 1960s. "A lot of it was lore passed down from one [person] to another; you learned that stuff as you do it," David Oldridge recalled.[26] The transition was intense. Bill Stadnyk (Radio Operator, Resolute Bay, 1963–64) recalled how outgoing personnel "didn't have much time to train new Operators because the departing personnel were eager to leave — some on the same flight the Trainee came in on! Training was often abbreviated and ... it was then up to you to do it the next day!"[27] Incoming OICs, in the few days before their predecessors departed, also needed to learn about the station's rhythms, routines, equipment problems, and the many challenges that came with working in cold weather.[28] Nonetheless, personnel at Mould Bay noted how new arrivals "slip into the way of things quite easily, and in a very short time it is not unusual to hear one speak of enjoying the life up here, even with its shortcomings."[29]

Keeping up with the airlift and subsequent sealift also heightened the need for seasonal labourers. Ottawa relocated four Inuit families from Inukjuak to the Resolute area in 1953 (see chapter 9),[30] which provided a new pool of workers to help offload supplies. Each spring, OICs at Resolute consulted with the local Royal Canadian Mounted Police (RCMP) officer who then hired at least five local Inuit to move fuel drums and other supplies around the base during peak supply periods.[31] Station personnel welcomed and appreciated this assistance. A 1954 report commented that the Inuit workers "remained on the job as long as there was work to be done, and [they] worked at a steady pace which facilitated rapid movement of cargo which could only be man-handled.… They were agreeable and very easy to deal with." The report recommended the continued employment of Inuit men in future airlift operations and discussed plans to train some Inuit to operate tractors, forklifts, and other mechanical equipment. Although these training plans were never implemented and Inuit were never hired as permanent JAWS employees, the temporary working relationship to support local resupply operations continued well into the 1960s.[32]

Figure 7-5. Inuit were not passive observers during the sealift. Many men worked as shore hands, but the research for this book did not uncover any photographs of their contributions. LAC R184, RG12, Acc. 1982-241 NPC, Box 192, 1940, 3857, C 0346--C 0349 3858 OS 0059.

The spring airlift also brought temporary southern workers to the satellite stations. In the winter, it was easy to keep up with the forecast requirements for the few flights over the archipelago, but the resupply season increased the frequency of flights so dramatically that an additional forecaster was usually sent from Edmonton to Resolute to help the OIC keep up with the demand. As the airstrips improved and commercial flights over the archipelago increased, demand for these forecasts grew apace.[33] Even when the Resolute station added a second meteorologist to its staff during peak periods, David Strang (OIC Resolute 1962–63) warned his replacement that he could "expect to be very short on sleep on many occasions, due to the pressures of the forecast office" during the resupply season.[34]

Figure 7-6. Lowell Demond having a dental exam at Eureka. The work required sufficient indoor space for the dentist to move around the patient and, in this case, the sole place large enough was a few feet from the washroom. Lowell Demond Collection.

As the resupply became more routine, DoT looked to short-term contract workers to assist with the loading and handling of cargo at Resolute. The program continued to hire between a half dozen and a dozen students to assist with resupply operations during the spring airlift and summer sealift. Most of these students worked at the hub station and occasionally helped with unloading at the satellite stations.[35] Each annual airlift also brought other professionals north, such as electronics technicians who typically took advantage of resupply flights to visit each station for half a week to service communications and meteorological equipment. This practice continued until the 1960s, when the increased reliance on automated equipment gradually led to the permanent stationing of an electronics technician at each station.[36]

Spring airlifts also enabled a dentist to visit station personnel. Although recruits had to submit to a dental check-up before they went north, assessment standards were "very lax," and the high sugar and canned good diets

of JAWS cuisine contributed to endemic dental problems. Understandably, the men looked forward to these visits.[37] For their part, dentists competed for the job as the three-week tour promised adventure and paid well.[38] Dr. Roy Hemmerich of Kitchener, Ontario volunteered for several tours in 1949, 1954, 1955, and 1956. The workload was intense: during one tour, he conducted over two hundred fillings and eight extractions. Nevertheless, as "an enthusiastic amateur photographer," Hemmerich "thoroughly enjoyed his short tour of duty."[39] If time permitted, the dentist visited each station — but this was rarely possible. Thanks to the high frequency of flights between the satellite stations and Resolute during the spring airlift, however, personnel serving at the satellite stations could hitch a ride to the hub to secure care. When dentists did reach the satellite stations, conditions were far from ideal. Although all stations had reliable power supplies, the dentists still used drills powered by pulleys at the isolated stations, and it was common for the next patient to "pump" the chords for his friend while awaiting their own examination.[40]

An RCMP officer also typically visited the satellite stations during April or May to ensure that personnel were complying with Canadian laws. Usually they arrived on resupply aircraft, but they also ventured to the stations via dogsled in the 1950s with Inuit guides. Although the police usually arrived in good shape, there were exceptions. In one case, a police officer and Inuit special constable[41] travelled thirteen days from the Craig Harbour RCMP detachment on southern Ellesmere Island to inspect Eureka. They "travelled light," expecting to hunt along the way, but encountered no game and arrived at the station in a "state of near exhaustion." After their arrival, the station provided the famished dogs with "all available tinned meats we can spare." During their visits, constables exercised Canadian sovereignty by swearing-in new postmasters and game officers and searching the stations for illicit pelts. Station personnel were strictly forbidden to hunt, and killing wildlife was only permitted in self-defence. In the case of polar bears, the desirable pelts were confiscated to remove any incentive to kill the animals unnecessarily. The police remained at the stations for up to several weeks, using them as bases of operation to patrol further into the archipelago, where they flew the Canadian flag, observed wildlife, and patrolled for possible visits by Greenlandic Inughuit (which we discuss in chapter 9).[42]

Given the central importance of aerial connectivity to the outside world, significant springtime activity focused on airstrips. A US Weather Bureau brief produced in 1950 cautioned strip mechanics that building new airfields was "not as easy as it may sound" because stations were built on or near "silty soils" that, when saturated with water from the spring and summer melt, created mud so thick that "tractors and vehicles cannot work in them." Coarse sand, which could also be found on-site, would not "suck up water and heave," so planners hoped that it would "freeze homogenously" to produce a robust land strip. Before proceeding with construction, strip mechanics were required to examine the existing and alternate sites, produce a "good photographic record" of physical features, and note surface water, permafrost, and local grade characteristics.[43]

Once the sites were selected and construction began, airstrip crews had to accept the limitations imposed by their locations. First, mistakes in building the initial airstrips by deep scraping had destroyed the permafrost and produced heaving surfaces. "The surest way to keep the permafrost from thawing is not to destroy any of the insulation which originally covered it and to increase the thickness of this insulation by filling on top," the Weather Bureau explained. To do so, strip mechanics had to resort to extraordinary measures that made use of local materials since fill could not be flown or sealifted to the site. Instead of deep grading, the airstrip teams skimmed the top three or four inches of large areas containing dry sand (and silt when sand was unavailable), which could only be revisited for more fill after the new surface had thawed and dried. This scraped soil was then used to fill holes and crown the airstrip's surface to minimize standing water. The method also yielded "maximum … vegetation," the fibres of which supported the tractors, provided additional insulation for the permafrost, and froze into the strip to bolster its structural integrity.[44]

Second, seasonal temperature fluctuations limited airstrip work to the brief period between early and mid-June, when the ground surface began to thaw and dry, and July when it became too muddy for heavy machinery. The trick was to "work as fast as you can in the early season," running the station's tractors "around the clock when the going is good," the US Weather Bureau advised. Crews of three men sometimes worked twenty-hour days, rushing against time to complete their workplans. When the soil thawed too much to support the machinery in late spring, crews

worked on drainage around the airstrip or assisted with other construction projects around the station. Overall, the average "working season" for airstrips lasted no more than sixty days.[45]

Owing to these constraints, the JAWS airstrip construction program took years to complete and required ongoing adaptations to specific local environments. To ensure safe air operations, the desired airstrip dimensions were 5,000 x 150 feet, but local conditions made this difficult to achieve in practice. Large aircraft could and did land at the stations using as little as 3,000 feet of runway, but this was "very close to the real danger line."[46] By 1953 Alert boasted a 5,400 x 150-foot airstrip that required improved grading and drainage, Eureka's airstrip measured 4,700 x 150 feet but remained "very rough" and required further "filing and grading," the Mould Bay strip was 4,900 x 100 feet and required widening, while Isachsen's airstrip measured only 2,700 x 150 feet.[47] At Mould Bay, muskeg (swampy, boggy conditions) reduced the size of the airstrip,[48] and the limited progress at Isachsen also reflected persistent local challenges. There, the best site available was located on a ridge north of the camp, and bad weather, coupled with the need to fill "severe longitudinal grades," delayed progress. The latter station subsequently had to rely on an ice strip for its spring resupply and a less reliable airstrip for its fall resupply.[49]

Before year-round airstrips were built at the satellite stations, tenuous access to the outside world after the ice strips were no longer usable in late spring forced station personnel to deal with health emergencies as best they could using the resources on-site. When Lowell Demond developed appendicitis at Mould Bay in July 1956, large portions of the still-unfinished landing strip had thawed and, despite the life-threatening nature of his condition, an air evacuation seemed excessively dangerous. After lingering in bed for nearly two weeks, one of his colleagues approached Demond and said "we've been talking it over a little bit and we've decided that we've been looking at the anatomy book and through the medicine cabinet and we won't let you die here if you're willing to let us try to remove your appendix." The cook agreed to boil the surgical instruments. Demond decided that they should "just wait a little longer," and his thoughts went to the cemetery plot overlooking the base where a young Inuk, who had died when visiting the station with her father, had been buried a couple of years earlier. "I genuinely believed that was where I was going to end up,"

Demond recalled. "I didn't think it was going to be possible to get out of there."[50] Fortunately, the crew of an ice-patrolling RCAF Lancaster took the risk of landing on the muddy strip and evacuated Demond to Thule, where a medical doctor removed his appendix.[51]

Ongoing improvements to the airstrips, which were lengthened and hardened over time to accommodate larger airframes, made scenarios such as medical evacuations during the shoulder seasons less worrisome. By the end of 1958, culverts had been added to divert water so that it did not saturate or erode the airstrips, thus allowing expansion of the runways at every station to approximately 5,000 x 150 feet (with the exception of Isachsen where the "somewhat rough and rolling" surface measured 4,400 x 130 feet).[52] The following year, work crews lengthened the strips beyond 5,000 feet, widened them to 200 feet, and installed better lighting systems. This improved safety margins and allowed larger and heavier aircraft, like the much-vaunted C-130 Hercules that had recently entered RCAF service, to land. This new transport aircraft, larger than the C-119 and capable of lifting much heavier loads, was harder on runways and therefore required more durable landing surfaces.[53]

Summer

The timing and duration of the JAWS summer season was similarly malleable. "High Arctic summers are a period of heightened activity for most of the region's organisms," historian Lyle Dick observes.[54] Depending on the station's location, summer arrived early to mid-July and lasted until mid- to late August, bringing daytime highs consistently above freezing.[55] An "exceptionally hot sun" could elevate local temperatures to 67°F (19.4°C).[56] Although the new season brought some of the strongest winds and heaviest cloud cover to the archipelago,[57] warmer temperatures and reduced snow cover encouraged station personnel to perform extensive outdoor work between the end of the spring airlift in April and the end of August.

Warmer summer conditions made hiking a popular activity. When work schedules and the weather permitted, adventurous personnel ventured miles from their stations to enjoy the exotic environment and magnificent isolation. Hikers had to inform the OIC or ExO of their departure in advance; they travelled in pairs, or groups, accompanied by dogs and carrying a rifle in case they encountered wolves or polar bears.[58] Floyd

Wilson, a cook from Colorado who eventually worked at all of the stations during the 1950s, explained the appeal of the Arctic to his wife:

> To you and I the Arctic presents a bleak picture at first acquaintance, but as a person becomes acquainted with it[, it] has many features of interest to replace mountains and trees. The sheer wilderness, and peacefulness is a powerful attraction once a person learns it. The quiet, and the isolation is soothing, and such sights as the Arctic moon is unforgettable.[59]

Hikers walked the coastline, climbed nearby hills and glaciers, and sought out wildlife. On a particularly long thirteen-hour hike to Griffith Island — about ten miles across the ocean ice from Resolute Bay in 1950 — Alan Faller (on leave from his meteorology studies at the Massachusetts Institute of Technology to work at the station) and visiting scientist John Galt discovered a previously unknown cairn. Afterwards, Faller felt that he and his companion "were Arctic explorers, if only in a minor way."[60] Other hikers collected fossils. These were usually small and scientifically inconsequential, but they occasionally made significant finds. In one case, a visiting geologist discovered a plesiosaur that was subsequently airlifted out by archaeologists.[61]

Most men carried cameras with them to document their surroundings. Encouraging station personnel to develop "an 'outside interest' has resulted in giving the Arctic the biggest number of amateur camera fiends on a per capita basis in the world," Frank Lowe of the *Montreal Star* observed.[62] Each station had a darkroom, and nearly everyone brought a camera north with them. The wildflowers that abounded for only a couple of months in the High Arctic were particularly striking. While filming a movie at Eureka, the Canadian National Film Board's Dalton Muir "found [that] hardened Arctic weathermen would melt at the sight of delicate blossoms fighting for life during the summer's perpetual daylight.… There are few who are not awed by reflecting on how seeds can be coaxed into life in a land where the permafrost recedes from only the top few inches of the soil."[63]

Personnel occasionally risked considerable peril to capture the perfect photograph of wildlife around the stations. Lowell Demond reminisced about his discovery of a muskox near Eureka:

> I had read about them and we had found out, for example, that when they became very old they usually stayed near the water, so you'd find them in the small valleys, rather than being able to travel from the water up to the food on the hillside. So I came across this old Muskoxen in this area one time, and I went back to the station (I was probably a mile or so from the station), and I went back and told the guys there "look I found an old muskoxen in that valley and I got a picture of him and [asked] if you fellas would like to get a picture." The two airstrip mechanics were there and they said they would like to have a picture of it. And I said "well come with me and I'll show you where this Muskoxen is." So we went off to see it and sure enough we found him. Just when we got there he sort of backed into this little valley and a little canyon that was there in this valley .… One fellow had taken a rifle with him and said "well you get a picture of him … I want a real close-up of that Muskox" and he said "… don't worry about it, because if he [the Muskox] comes after you or anything we'll shoot him." So I started and got up close. He had a Rolleiflex camera and you looked down into the lens and I was looking down in it and the image got larger and larger .… This Muskox gave me a bang and the camera went flying in the air and he hit me right on the wrists and my hands. I backed off quickly and I was very fortunate that he basically walked right back as fast as he could into that little crevice in the valley. So I looked for the other guys and they were running down the other side of the mountain and I wasn't far behind them.… It was just one of these stupid things you do.… We all did a few of them.[64]

For others, vistas became permanently etched in their memories. "On the more sublime edge of life at Isachsen," Archie Asbridge remembered "sitting on top of a high rocky slope overlooking Dyer Bay a couple of miles from the weather station." On that day in mid-July 1958, he was "totally alone" except for "Boots," a station Husky:

Figure 7-7. John Gilbert observes Resolute from a distance in 1956. John Gilbert Collection.

> The dog had followed me on my walk from the weather station. I was sitting upon a large rock that most likely had never been sat upon before. There is essentially no vegetation in that region of the arctic except for lichens and moss and if luck happens one might see a bird during the short summer, but not on that particular day. The sky was cloudless with a deep blue colour influenced by a high-pressure weather system that produced little or no wind to speak of. I sat in total silence for about ten minutes except for the sound of my own breathing and the lapping of the dog's tongue. There was a feeling of complete and unforgettable serenity. The silence was deafening.[65]

The opportunity to immerse oneself in a vast and spectacular landscape, gazing over open tundra or seas that personnel knew were devoid of other human presence for hundreds if not thousands of kilometres, inspired awe and wonder. For Asbridge, it also brought a sense of tranquility, borne of

the knowledge that he could return to a station that offered refuge from the desolate, sublime geography around him.[66] The chance to slip away from the quotidian routine, if only for a few hours, could serve to fortify one's spirits and restore energy for station work.

Recreational time was limited by outdoor construction, maintenance, and resupply tasks. The construction season began in April or May, was most intense from June to August, and ended as late as possible in the early fall. During the height of summer, the work was so extensive and intense that one ExO expressed amazement at "just how much work, totally unrelated to the scientific function [of the stations], is carried on here."[67] In 1959, for example, Alert ExO Monte Poindexter "was very busy making improvements on and around the station aided by any one and every one [*sic*] he could recruit." That year's work included relocating the old inflation shelter, remodelling a 16 x 16-foot "shack" into transient accommodations for up to eight visitors, filling low spots around buildings to improve drainage across the entire station, and extending the aircraft parking area by thirty feet.[68] Everyone, permanent or transient, was expected to assist with work around the stations as long as it did not interfere with their assigned duties, and most individuals were willing to work overtime to take advantage of the warmer weather.[69] Alert's strip mechanics were instructed to "assist graciously" with the station's extensive building construction program in 1962 by hauling materials around the station when the station mechanic was unavailable.[70] Most transient personnel also volunteered for "household duties" to compensate for the additional messes created by their presence.[71]

The peak temperatures of summer also made it an ideal time for painting and other exterior improvements to the stations.[72] In April 1953, R.W. Rae and Glenn Dyer, the Chief of the Arctic Project Division at the US Weather Bureau, inspected Eureka and were "dismayed at the mess around the camp area."[73] The new OIC Fred Ayling and ExO Ken Moulton organized and led an extensive improvement effort that spanned the entire next summer. Station personnel repainted buildings, fixed plumbing fixtures, erected radio aerials, dug and stocked a new in-ground refrigerator ("reefer"), moved supplies to a new cache, and gathered garbage to be burned and/or deposited on the ice to drift into the bay and sink.[74]

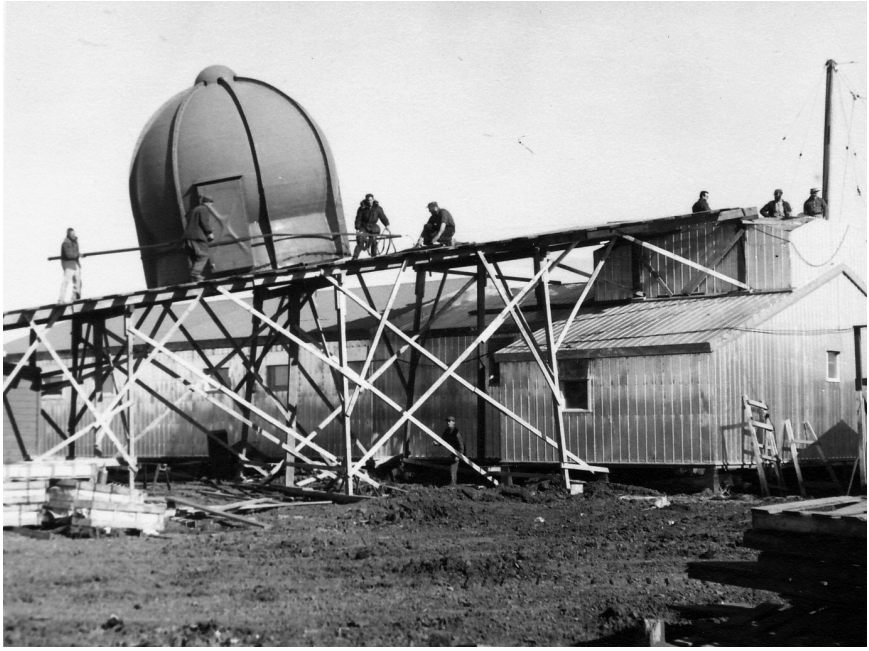

Figure 7-8. Installing the rawinsonde dome at Isachsen. Jim Jung Collection.

Station crews undertook other clean-up tasks during the summer season. The most frequently noted eyesores at the satellite stations were the drum caches. Reliable sea access to Resolute allowed the hub to receive bulk fuel transfers from ships to its tank farm by the early 1950s, with fuel then pumped into 45-gallon drums that ships carried to Eureka and aircraft flew to Mould Bay and Isachsen. (Aircraft also transported filled fuel drums to Alert from Thule.) At the satellite stations, the emptied containers were supposed to be inspected for damage and either cleaned or compacted before being returned to Resolute for reuse or disposal.[75] Nevertheless, empty drums rapidly accumulated at all the stations.[76] Installing fuel farms at the satellite stations in the early 1960s somewhat mitigated the problem, but JAWS program managers in the south saw little incentive to clean up the detritus and most remained on-site until Environment Canada implemented a systematic oil drum cleaning, crushing, and removal program in the 1980s.[77]

Warm summer temperatures also contributed to the annual break-up of ice in the waters of the Arctic Archipelago. The major summer sea supply was essential to sustain the JAWS program, given the expense and difficulties in transporting large structures by air. After the establishment of Isachsen and Mould Bay by sealift in the 1940s, planners concluded that ships could not safely and reliably reach these outposts each year, so their supplies were sealifted to Resolute, stored, and then delivered to their final destinations during the subsequent fall airlift. At the other stations, however, preparations for the much-anticipated summer sealift meant a flurry of activity. Mechanics performed last-minute repairs to station vehicles, while other personnel readied drums for "backloading" onto the ships, made soundings in the bay, or built up the station's jetty. Some years, station personnel prepared bases for new structures that sealift crew and equipment would position upon their arrival.[78]

The scale of the JAWS sealift also entailed significant planning and organization in the south. When the US Navy initially ran the sealift, goods ordered up to two years in advance were stockpiled at the South Boston Annex of the Boston Naval Shipyard. After the Royal Canadian Navy assumed responsibility for sea-borne resupply in 1954, goods were stockpiled in Montreal. Over time, logistical and operational planners built on previous experiences and improved processes to ensure that cargo destined for the stations was properly packaged to survive voyages by sea and air. They also adopted colour codes to ensure that the right cargo arrived at each station. By 1953, George Rabbitt, who oversaw general procurement and supply for the US Weather Bureau's Arctic Operations Project, reported that "after much trial and error we have found a good solution to packaging, processing and documenting our cargo with the desired result of having it delivered to our remote stations and with accurate records of both delivery and receipt."[79]

Refined practices improved the unloading and organizing of goods at the stations, but operations did not always unfold as planned. Sealifting supplies to the stations remained a complex operation requiring resolve, luck, and constant adaptation to local ice conditions, weather, and damage. Contingency plans for the satellite stations instructed captains to cache their loads at Thule for delivery the following year if they were unable to reach Eureka or Alert.[80] A case in point was in 1953 when the icebreakers

USS *Staten Island,* USCGC *Westwind*, and USCGC *Eastwind*, as well as the cargo vessel USS *Wyandot* and tanker USS *Nespelen*, encountered the worst ice conditions in the eastern Arctic since the program began. To make matters worse, dense fog around Resolute prevented long-range aerial ice reconnaissance, again proving that "the most carefully laid plans for aircraft employment" could fall victim to "the guns of Boreus [*sic*] Rex." When *Westwind* and *Wyandot* neared Resolute Bay on August 8, they found it covered by an ice floe approximately one mile square and 3-5 feet thick. The resupply group attempted limited unloading from a distance, but ice and fog stymied their efforts for the reminder of the day. With no sign of improvement, they deployed a demolition party that placed twenty shaped charges and 90 lbs of dynamite on the flow — but the blast had "no immediate effect." The next evening, a high flood tide helped break up the ice and the ships proceeded into the bay the following morning, where their landing craft "ice dozed" the bits from the anchoring area. Transferring the supplies then began in earnest, with various ships arriving, unloading, backloading spent station material to the ship, and then departing over the following week.[81]

Operational challenges persisted during this "routine" resupply mission. *Westwind* spent six days "battering through" 9/10 ice concentrations that threatened to block access to Eureka. Finally arriving at the satellite station on August 19, the crew found Slidre Bay to be ice-free and immediately began the "gruelling" task of unloading.[82] With the station's resupply completed three days later, the ship hosted a dinner and movies for station personnel, and then promptly departed that evening at 9:45 for Thule. Rejoining its "battle against the ice" at Graham Island, *Westwind* took three days to reach Hell Gate where it had to reverse engines, narrowly avoiding being run ashore by a one-mile-long floe that closed onto a beach with a "tremendous crushing and grinding." The ship's captain, keenly aware of the dangers and proceeding cautiously, was startled by how the "situation could change so rapidly" and repeatedly emphasized the need for "patience" in his after-action report.[83]

Meanwhile, *Eastwind* left Thule en route to Alert on August 10, but it was forced to return to Greenland after losing two blades from its starboard propeller while battling heavy ice at Kane Basin the following day. The mantle then passed to *Staten Island*, which departed Thule for Alert

via Route Gardenia on August 17. Encountering heavy ice when entering Kennedy Channel on August 19, it lost ground by drifting twenty-two miles south before battling 10/10 coverage ice for the next three days. Extensive pressure within the floes frequently trapped the vessel. "On one occasion," the after-action report noted, the ship was caught by one of these pressure areas and "suddenly popped out like a cork from a bottle and practically bounced over the next floe." Conditions were so dismal that someone at Alert radioed *Staten Island* and, without the authorization of his superiors, told the ship's radioman that there was a "good chance" that the vessel and its crew would be forced to winter there since Dumbbell Bay was "completely ice-filled." Undeterred, *Staten Island* reached the outskirts of Alert at 3:30 am on August 27 and "commenced forcing an entrance into the harbour," eventually anchoring 400 yards away from the loading site at 10:00 that evening. "Working furiously against time and adverse ice conditions," the crews finished unloading by 11:30 pm the following day. Forgoing the traditional reception for station personnel, *Staten Island* departed for Thule a half hour later. In all, the icebreaker required twenty-one days to complete the round-trip voyage that planners had hoped could be accomplished in eleven days, arriving back at Thule on September 7 after the longest sealift voyage to that time. The ship's captain and the commander of the naval squadron both recommended that, in future years, "icebreakers proceeding to Alert be prepared to winter."[84]

Although extreme, the difficulties experienced during the 1953 summer resupply were not unique. Inter-seasonal variability meant that planners could not predict local environmental conditions at the stations, forcing continuous adaptation. The following year, the Canadian icebreaker CGS *D'Iberville* struggled against unusually heavy ice before arriving at Eureka and ultimately failed to reach Alert as planned.[85] Indeed, the risks of shipping goods to Alert proved to be too high and officials discontinued the sealift to that destination altogether from 1956 onward.

The 1960 sealift to Resolute and Eureka also highlighted arduous conditions that required flexibility and adaptability. After departing Montreal in late July, the vessels of Nors 60 arrived at Resolute Bay between August 11 and 12, but could not begin unloading because Resolute Bay was 8/10 covered with heavy ice. While waiting for conditions to improve, crewmembers went ashore by helicopter and helped station personnel to

Figure 7-9. CGS *D'Iberville* photographed from the air while resupplying Eureka, 1957. Lowell Demond Collection.

perform mechanical maintenance and repairs on Resolute's barges, as well as scraping and painting the vessels' hulls and super-structures. On August 14, unloading finally commenced. The tanker MV *Irvingwood* began the multi-day process of pumping 815 short tons of avgas, 747 short tons of jet fuel, and 1,778 short tons of Arctic diesel into Resolute's tanks. Meanwhile, the other vessels deployed their heavy lifts and equipment and the Bay soon buzzed with four LCMs, one tug, six barges, and one motor launch shuttling supplies ashore. As supplies arrived on the beach, personnel had to unload and systematically stow the crates according to their storage requirements or destination. Over the next two and a half weeks, however, storms and ice conditions frequently complicated these activities. Gale force winds, for example, prevented any landings from August 17–20, while a similar storm halted operations from August 25–27. The continued presence of heavy ice compelled over half of the small vessels to unload their supplies at a northern beach, which had to be reloaded onto

vehicles and driven to the station over one and a half miles of roads that were in poor condition due to "record" heavy rains preceding the sealift's arrival. From August 28–29, crews backloaded empty helium cylinders and other spent supplies from the north beach. Early the following morning two aircraft ferried the stevedores to Montreal and the remaining vessels weighed anchor. Concurrently, the vessels venturing to Eureka that same summer encountered "little or no ice" in Jones Sound, Hell Gate, or Norwegian Bay, and unloaded 144.5 short tons of cargo and 392 short tons of various fuels at the station in just over seventy-three hours with three barges.[86]

While resupply ships were at anchor, unloading efforts consumed all personnel. The OIC remained responsible for the station's overall operations, the ship captains commanded their vessels, the ExO oversaw unloading and caching ashore, and all other personnel assisted with these activities insofar as their jobs allowed. When landing craft reached the beach, ship and station personnel moved the cargo onto the station's sleds, which were towed by tractors to the applicable storage buildings or "reefers" and "manhandled" into place. Speed was of the essence, as crews raced to complete the work before ice conditions changed for the worse. Sometimes a ship's crew loaded the landing craft quicker than the shore-based crew could handle, forcing the latter to drive their sleds a short distance from the jetty, quickly unload the supplies to await proper storage at a later date, and then return to the shoreline for more.[87] When the sealift floated large objects ashore, such as new bulk fuel storage tanks, the ship's crewmembers helped to move the structures into place.[88] During this feverish time, radio operators worked long hours to maintain ship-shore communications, and upper air observations were either maintained by a skeleton staff or briefly curtailed. In their spare moments, personnel read incoming mail and drafted quick responses to send out when the vessel departed.[89]

The sealift continued to reverberate even after the ships left for the south. Station personnel spent several days properly storing supplies that had been hurriedly offloaded. At all of the satellite stations during the 1950s (including Mould Bay and Isachsen, which received goods by air-drop during the summer months), the men enjoyed fresh eggs, fruit, and vegetables — a welcome change from their typical diet of canned foods.

Since a station's "reefers" (underground storage cavities built into the permafrost[90]) would spoil fresh goods and its electric refrigerators were small, personnel stored what they could in the kitchen or garages and consumed these foods as quickly as possible. At the dining table, station crews shared meals with newly-arrived permanent personnel and temporary staff assisting with construction projects.[91]

Station populations peaked during the summer, taxing each location's resources. The added people "put a strain on the day-to-day operations since the living quarters and messing facilities were barely acceptable for the normal eight bodies[,] let alone" additional summer workers and visiting scientists at the satellite stations, Asbridge recalled. He described cooks as the essential "catalyst for creating a harmonious crew in isolated living conditions,"[92] and the added workload to satiate extra bodies at the stations took its toll. Cook Paul Reid, for example, recalled serving between fourteen and seventy people at a time during his six-month tour at Alert in 1963.[93] Although the JAWS program despatched assistants from the south to help out, some cooks buckled under the additional stress and had to be replaced.[94] At Mould Bay, Isachsen, and Eureka, where the population swings were less severe, station personnel took turns on "KP" by helping the cook to prepare meals and clean up afterwards.[95] Although the end of the summer would bring colder temperatures and portend the return of the dark season, it also anticipated a contraction in the number of men at the stations and a return to a more predictable routine.

Autumn

The sealift effectively marked the end of summer for the JAWS program. Autumn arrived in late August or early September and lasted until late September or early October, bringing a short and violent season of transition to the High Arctic. Air temperatures dropped, producing "almost continuous" fog and low stratus clouds over open water. During this brief season, winter pressure patterns began to form, and storms became less frequent but more intense. Cloud coverage, wind speeds, and snowfall all typically reached their annual apexes.[96] R.W. Rae recalled experiencing a particularly "destructive" storm at Resolute in September 1951:

> The wind gradually picked up from the south-east to an average speed of 50–60 [miles per hour] with gusts up to 70 mi/hr. I went outdoors to see what damage was being done, and it shook me a little to see 4 ft by 8 ft sheets of ½ in. plywood flying through the air with the greatest of ease. The plywood pile had been sand-bagged, but apparently the top sheet had not been quite flush with the rest of the pile for the wind lifted it off, sandbags and all. After that the sheets were flipped off one by one like cards from a pack. Fortunately, none of the main buildings was hit by the larger airborne missiles, but the R.C.M.P. constables' outdoor latrine suffered a near-mortal blow. A square hit amidships would probably have sliced it in two. As if the wind were not enough, it began to rain — a hard, driving, splattering, freezing rain that plastered everything outdoors with a half inch of solid clear ice. The weight of the ice broke one of the antennae and crumpled the mast of our radar beacon. For a while there was such a crashing and banging that it seemed as if the world were coming to an end.[97]

Between storms, station personnel braved worsening conditions to prepare the buildings for winter. They learned to guard against fires by checking and recharging all fire extinguishers, as well as cleaning oil stoves, pipes, and fuel lines. Autumn was also the ideal time to inspect buildings for cracks through which blowing snow would infiltrate during winter storms. Personnel also graded the grounds and prepared tractors and other machinery to operate in winter conditions.[98] Finally, the men "stored or battened down" remaining supplies in warehouses or the station's cache to prevent the sort of calamity that Rae had witnessed in 1951.[99]

Some years, completing existing construction projects before winter became a major undertaking. In 1953, seven personnel at Eureka completed so many construction projects that they began referring to themselves as the "Eureka Construction Company." Throughout late August and September, this group diligently worked on projects even though cold winds proved "a severe detriment to this outside labour." Most of their structures turned out "quite well," with a few exceptions: a water storage shed was "slightly out of 'square,'" although comments about this

imperfection were greeted with cries of "'rigours of the Arctic' and 'improvise,' by the old hands."[100] Eureka personnel undertook similar work in 1959, cleaning up the grounds and redecorating buildings so that the "difference in appearance should be quite obvious even to the most critical of inspecting personnel."[101]

The return of cooler temperatures also made the ground sufficiently firm for strip mechanics to resume working on the satellite stations' land-based airstrips. Occasionally, the freeze was rapid and complete, making the ground impossible to grade or compact together after only a few days. During the late 1940s airstrip crews had often missed this "short favorable period," and strip mechanics were urged: "be ready for it and don't miss it."[102] Experience soon showed that a willingness to conform working schedules to changing soil conditions paid dividends, as crews at Alert showed in 1953 when they managed to work on the airstrip for nearly four weeks between mid-August and mid-September.[103]

The residents of Isachsen and Eureka also took advantage of colder temperatures to venture onto the hardening sea ice with a bulldozer and sleds to harvest portions of the nearest multi-year iceberg for their stations' winter water supply. The age of the ice was important because fresh ice still contained sufficient salt to render it undrinkable. Each late autumn day, station personnel took turns braving the -20°F to -30°F (-29°C to -34°C) temperatures during the few hours of daylight to chip blocks from the berg. These bits were then loaded onto sleds, towed back to the station, and deposited in a cache where they could be easily removed during the winter and brought indoors to be melted. One note claimed that the Isachsen station required more than twenty-five tons of ice to get through the winter. Even after bulk water tanks were installed at the satellite stations in the mid-1950s, chronic water shortages meant that personnel continued to harvest ice during the fall until at least the end of the decade.[104]

In the second half of September, when the airstrips fully refroze, aircrews and southern planners used the remaining daylight to conduct a brief fall airlift to the satellite stations. Although the scale of the spring airlift dwarfed its autumn counterpart, the landings during the pre-winter season remained an "extremely desirable"[105] time to bring equipment, food, and material to the stations. "It was a great feeling of 'renewal' to be able to eat a few mouthfuls of lettuce and tomatoes only to realize that this

Figure 7-10. Airlifts could be treacherous. This RCAF C-119's landing gear collapsed after it touched down just short of the runway in 1957. After extensive repairs it was flown out the following spring. Merlin MacAulay Collection.

delicacy would shortly become a dream for the next six months," Asbridge remembered.[106] The high winds and low visibility sometimes created "marginal" flying conditions and aircrews occasionally had to return to Resolute or Thule with their stores aboard, but most flights managed to land.[107] The end of the season also meant a time for goodbyes. During the 1950s, when planners did not authorize dark period landings, the fall airlift represented the last opportunity for seasonal personnel such as strip mechanics and visiting scientists to depart, as well as a final opportunity to rotate year-round personnel in or out of the stations. One or two flights to each station by USAF or RCAF aircraft were typically sufficient to satisfy these requirements, although up to a dozen landings sometimes proved necessary.[108]

When these flights arrived at the satellite stations, all available JAWS personnel were once again pressed to service unloading aircraft. This time, crews worked with even greater haste and precision; unlike the spring and summer, low temperatures and high snowdrifts would make it extremely

Figure 7-11. An RCAF North Star taking off at Mould Bay circa 1952. Environment Canada.

difficult to locate temporarily-placed stores in the winter. Akin to the spring airlift, each series of flights ended with a "clean-up" sortie that addressed each station's last-minute resupply requirements. In the mid-1950s, journalist Ritchie Calder flew to Resolute in a Flying Boxcar (Fairchild C-119) for one such flight — "the last supply aircraft which would go into the High Arctic until the freeze-up restored ice-landing fields the following winter. This was the last occasion when the remote weather-stations … would get supplies, so the aircraft's load was an extraordinary collection of sundries, a sort of last-minute shopping bag, not only of provisions but bits of machinery and replacements" for the weather station staff.[109] Until the early 1960s, this landing also offered the final opportunity for personnel at the satellite stations to send and receive mail. The departure of these final flights was poignant, with Pete Johnson recalling how the stations fell "absolutely silent" as the aircraft disappeared over the horizon.[110]

Winter

As autumn yielded to winter, the stations reached their most isolated state. The longest season of the High Arctic year lasted from October to May, with temperatures reaching their annual lows in February. At Isachsen, which typically endured the worst weather of all of the stations, winter temperatures generally hovered between -13°F and -49°F (-25°C and -45°C) but could dip even lower.[111] Storms moderated in intensity and frequency, however, and precipitation decreased, but blowing snow created massive drifts around obstructions on the landscape.[112] Despite calmer conditions, the long Arctic nights and extreme cold made the stations particularly difficult to reach. The duration of the dark period depended on the station's latitude, but the sun did not rise above the horizon from approximately November to February.

Aside from the stations' electric lighting, the moon provided the only source of illumination because the JAWS network was too far north to experience the aurora borealis with any regularity.[113] When the moon was full during the dark season, Rae noted that it did not set for several days. The sky turned a "deep bluish purple, the moon an orange yellow and the snow … a ghostly white. The scene has a peculiar fascination, but it is a cold, frigid, unreal type of beauty."[114] To many people who overwintered at the stations, the moon was "absolutely inspirational. It was like a grapefruit hanging there," Howard Wessbecher recalled. "You wanted to reach up and touch it, it was so clear."[115]

By 1950, JAWS planners determined that winter landings at the satellite stations were too dangerous, and each of these stations instead received their Christmas resupply via airdrop.[116] Although this mode of delivery meant that wintering personnel at the satellite stations did not have to clear their runways of snow, dark period airdrops still required considerable preparation. Typically timed to coincide with the last full moon before Christmas, the flight could be scheduled to arrive anytime between the end of November to a day or two before Christmas. When the aircraft radioed that it was getting close to the station, personnel rode out to the designated drop zone, located a mile or more away from the stations on the ice to keep circling aircraft away from the surrounding topography. When station personnel arrived at the spot, they lit flare pots

or other receptacles filled with diesel and toilet paper in a pre-determined pattern to signal wind direction as well as a drop zone for the overflying aircrews. Aircraft required five or more passes to safely drop all of the baskets. According to documented airdrops, at least one chute typically failed to open, rendering presents or fresh food for Christmas dinner unsalvageable.[117] Unlike most goods, aircrews free-dropped Christmas trees from their aircraft. (One tree, after losing 90% of its needles during its descent to Eureka in 1951, "landed upright in the snow," leading the station diarist to joke that "one would believe at first glance that they had been growing … for 20 yrs."[118]) Sometimes the goods landed close to the drop zone, and on other occasions they landed over a mile away, forcing station personnel to comb the area in dark and cold conditions to find them before they vanished in the drifting snow.

When crews arrived back at the station, they brought the parcels inside the mess hall where the unwrapping began. Contents usually included the fixings for a turkey dinner, alcohol, fresh vegetables, and mail (including Christmas presents). For many personnel, the unpacking that followed the airdrop "was really Christmas day." Lowell Demond, who had arrived back at Eureka in August 1956 after recovering from his appendectomy, described the event in a letter to his parents. The OIC, acting as postmaster, was responsible for receiving the mail, and eager personnel lined up to help him expedite the work. Soon, the panniers' packaging and contents were so strewn about the operations building that "there wasn't room to move around," Demond recalled. After the parcels were unpacked and their contents distributed to their eager recipients, most of the station's personnel retired to their respective rooms to pore over their new letters from home.[119]

In the days or weeks that followed the Christmas resupply, personnel decorated the tree and mess hall. The official celebrations, of course, did not come until December 25 when work duties were kept to a minimum. Several personnel contacted loved ones using phone patches (see chapter 8), while others sent and received Christmas greetings via Morse code.[120] Donning travel suits that most had not worn since arriving at the stations, the crew enjoyed a formal dinner and feast, "complete with cranberry sauce," that the cook timed so that all personnel could partake.[121] Camaraderie sometimes led to joking. At Mould Bay in 1954, for example,

Figure 7-12. Resolute's comparative accessibility sometimes allowed travelling shows led by celebrities like CBC's Tommy Hunter to visit the station during the holiday season. Christmas, 1959. Archie Asbridge Collection.

"surprise packages were given out in keeping with the holiday spirit. O. Pat Ucar received a box of shotgun shells (no doubt for his defence [as he had claimed to see wolves during the past months]), Norm Wahl received an old caribou hide, and the cook, McDade received a fine fedora hat … his own."[122]

Resolute enjoyed more elaborate celebrations than the satellite stations. Even in the early 1950s, aircraft landed on its airstrip at least once per month during the winter.[123] Some years, Resolute even hosted guest entertainers — with mechanical and weather problems sometimes keeping them at the station longer than expected. In December 1962, for example, "a troupe of CBC entertainers" visited Resolute and provided a "most welcome diversion for all of us," ExO Bruce Aikins recorded. The next day, however, the Hercules aircraft carrying the group developed landing gear problems, "so we were treated to a second show and dance." The RCAF diverted a second C-130 from Christmas flights in the eastern Arctic to take the entertainers home, but it experienced engine trouble and had to divert to Namao for repairs. "A third plane summoned from Montreal

Figure 7-13. Christmas celebrations at the satellite stations were less elaborate than those at Resolute, but the festivities still featured all the trimmings, as these three photos from Mould Bay in the mid-1950s attest. Jim Jung Collection.

developed engine trouble en route and was forced to stop at Churchill," Aikins recounted. "By this time weather conditions began to deteriorate and when the airlift plane came back from Namao it was unable to land here and flew on to Thule to wait out the blizzard. Temporary clearing on the fifth day permitted a landing at last, and the troupe was able to leave." Station personnel unanimously agreed that the entertainers "qualified for overtime pay and northern allowance plus special commendations" for their endurance.[124]

After the bustle of the holiday season, JAWS personnel settled into a winter routine in which station life slowed "to a walk."[125] Howard Wessbecher recalled how "civilized problems" such as colds disappeared soon after the final aircraft had left and did not generally reappear until the following spring. With work and leisure almost entirely confined to indoor activities, schedules became less prone to disruption. To keep busy, personnel undertook work inside the buildings that they had side-lined during the summer's busy outdoor schedule. "Soon after Christmas we

Figure 7-14. George Toney painting pocket bookshelves at Isachsen on 7 February 1952. LAC, RG 93, Acc 81-82-084, Box 18, File 6754-1291 pt 9.

found things getting very dull so we started to reconstruct the station," Eureka radio operator John Gilbert recalled. Personnel "painted all the rooms, built cupboards, [and] remodeled the radio room."[126] A few years later, a different team installed new floors, painted walls, and fixed doors in several buildings.[127] Other stations took similar care,[128] and smaller projects were also common.[129]

Outdoor activities were extremely limited during the dark period and were generally confined to weather observations, measuring ice thickness on the bay, retrieving ice for drinking water, observing fire watches, and maintaining vehicles and diesel generators. Heading out of the stations for a walk could improve morale but entailed considerable risk, so station leaders either discouraged strolls around the buildings or airstrip or only

allowed them during full moons to reduce the chances of a person becoming disoriented in the dark. Polar bears also ventured closer to stations during the winter, reinforcing the importance of the "buddy system." Personnel had to carry a gun and inform a "responsible party" of any plans beyond travelling from building to building, and men were forbidden from venturing more than three miles from the camp on foot. If they encountered problems, they were reminded that "the recognized distress signal consists of three shots in rapid succession."[130] Resolute ionosphere station OIC Lloyd Cope, for example, "encouraged all who would to go walking on bright moonlit days, or at least when there was enough light to see down the barrels of their guns. It was not unusual to see as many as ten men walking among the frozen 'growlers' out on the bay, each with a loaded rifle in the event there was a bear around the corner."[131] Working on the northern edge of the continent's Arctic meteorology network also left the satellite stations with little warning of approaching storms. During the winter of 1959–60, a sudden snowstorm left a party of Eureka hikers (who had disobeyed the OIC's instructions to remain near the station) trapped outside for twelve hours. Fortunately, no one was injured.[132]

Extreme temperatures and darkness also limited aircraft from reaching the satellite stations, heightening the sense of isolation. Station culture therefore included a healthy dose of caution and prudence. Bob Frank (OIC Eureka 1957–58) explained to a reporter that: "We were told … if you have a problem during the [four-month-long] dark period, you're on your own. We were reasonably cautious."[133] Consequently, station leaders regularly warned personnel about the dangers of "carelessness," and most personnel heeded the advice.[134] This isolation also encouraged a culture of self-reliance and improvisation. Lowell Demond, having survived appendicitis during the summer of 1956, subsequently developed an ingrown toenail the following March. When it failed to improve, Bob Frank consulted the station's copy of *Gray's Anatomy* and decided that removing the toenail was "nothing difficult." Demond recounted how:

> Bob announced we would simply use whiskey to freeze the toe, we would sterilize the tools with boiling water, Galen Olsen [the station mechanic] would pull a rag tightly around the toe to prevent bleeding and we would proceed. All I had to do

> was agree .… I was seated on a lounge chair which had wide wooden arms. My left foot was raised on a low stool and Bob was seated on a chair behind my foot … Olsen was standing to my left. Bob announced it was time to start the freezing process which was to be station whisky. He said it would be two drinks for the patient and one for the doctor. Somehow this got terribly mixed up, with the doctor getting much more than the patient. All of the tools had been boiled on the kitchen stove and laid out near Bob. Ole tied the tourniquet around the toe, Bob picked up the scalpel [and made the first incision]. Then he announced I should have another drink of whisky, which I did. Without hesitation, he picked up the needle nosed pillars which came from Ole's garage, applied them tightly to the front of my toenail and, pulling steadily upward, pulled it off. Then he bandaged the toe.… Then Bob announced, only one thing left to do. With that, he picked up the whiskey bottle and poured about a half cup right over the bandage. He claimed this was the way John Wayne treated a wound in the old western movies.[135]

With professional medical attention inaccessible, self-reliance and improvisation such as this were essential. Over four decades later, a proud Bob Frank reminded Demond that his toe had not bothered him since.[136]

Dark period landings at the satellite stations did not resume until the late 1950s, and several additional years passed before these landings became routine. The archival record concerning the phasing out of airdrops and reintroduction of dark period landings is fragmented and minutes of some pertinent meetings are missing, but existing evidence indicates that improved landing facilities at the satellite stations, the cooperation of JAWS personnel, and the tenacity of RCAF operators led to the gradual resumption of winter landings. The first recorded instance occurred at Mould Bay on 19 December 1959, when an RCAF aircraft arrived to collect Isachsen's mail (which had been air dropped at Mould Bay by mistake).[137] Two years later, an RCAF aircraft landed at Eureka and Isachsen. Neither of these stations had received fresh vegetables during their autumn clean-up flights,[138] and both urgently required electronics parts as

well as heavy and bulky spare parts that "could not be airdropped satisfactorily."[139] RCAF crews told Resolute OIC B.A. Coulcher that dark period landings were possible as long as the weather was favourable and satellite airstrips were well lit and cleared of snow. Coulcher, in turn, hoped that "if such a plan is carried out successfully then perhaps serious consideration could be given to a repeat performance annually at approximately the same time. This naturally would be in keeping with the steady progress and growth now in vogue across Canada's northland."[140] When the day arrived and the aircraft landed at Eureka, the pilot told station OIC Vlad Jelinek that the runway was "very smooth and exceptionally well lit, better than airstrips down south." Eureka personnel "definitely considered" the change a "welcome improvement," and Jelinek hoped that Christmas landings would become an annual event.[141] Southern planners remained more skeptical about the reliability of winter landings at the satellite stations than RCAF aircrews and JAWS personnel,[142] and air drops continued until the mid-1960s when Atlas Air Services under Weldy Phipps provided year-round light aircraft resupply flights to Eureka, Isachsen, and Mould Bay on the improved airstrips.[143]

Despite aeronautical advancements, station personnel continued to feel secluded and helpless when facing serious illness during the winter. In November 1965, for example, met tech Bert Formuziewich developed abdominal pains at Isachsen. Within a few days these pains became acute and, after checking for symptoms, his colleagues suspected appendicitis. Within half an hour, they relayed Formuziewich's pulse, temperature, and other health indicators to southern physicians who instructed the station to prepare Formuziewich for evacuation. The expected aircraft did not arrive for nearly thirteen hours and the station's personnel grew increasingly alarmed at their comrade's deteriorating prospects:

> Bert was doing reasonably well up until 4 am when his temperature began to rise suddenly and rapidly. His condition became progressively worse and we began to sweat. Up until about 2 hours before the plane got here the weather was excellent. But it began deteriorating until the time the aircraft was due. The wind had suddenly sprung up and was blowing snow quite badly. Also low clouds and fog were rapidly moving in.

> The plane circled and made several attempts at landing for about 45 minutes. We had taken Bert up to the strip as soon as the aircraft came overhead. It all looked hopeless and with Bert beginning to go uncomfortably cold it was thought best to return to the station. With considerable foreboding, visions of laying Bert out on the kitchen table and sharpening up Joe's butcher knives — we came back to the Ops. Bldg. to learn the good news — the plane had made it down.[144]

Although it was later confirmed that Formuziewich's appendix had burst at Isachsen, he received life-saving surgery at Thule, Greenland. Shaken by the incident, ExO John Llewellyn reflected on the event in his monthly report and wondered:

> what would the outcome have been with another hours [*sic*] delay. What would have happened if Bert were not such a sturdy and healthy guy? The realization that such a long delay in getting one of us to medical attention had actually come about had a variety of affects [*sic*] on the Staff here at Isachsen. On some of us it was quite demoralizing. … Others hopelessly accepted the situation as one that little [could] be done to alleviate. … We did what we could for Bert here, using our meager knowledge of first aid for such ailments. The best we can manage at these isolated stations is to keep a person comfortable, warm and under sedation; requesting help from the outside hoping that it will get here in time.… No one here at Isachsen has an MD appended to his name.

Llewellyn took the unusual step of recommending in his Station Activity Report that the RCAF should base a C-130 at Resolute Bay so that the response time to reach Isachsen could be reduced from thirteen hours to four. "IS LIFE NOT SO DEAR?!?!?!" he asked rhetorically.[145] Canada's limited airlift resources made fulfilling this request unfeasible, and the continued challenge of flying in winter storms limited the effectiveness of forward positioning aircraft.

With limited opportunities to venture outside of their stations, the men longed throughout the winter for the return of the sun. Although the glow of an Arctic dawn preceded the sun's actual reappearance for several weeks, the anticipation led JAWS personnel to shift dinner table talk at the stations to what they would do when they shipped out.[146] In February 1952, the crew at Isachsen donned their "good trousers" for the first time since Christmas to determine whether they still fit. Others devoted evenings to packing, even though their departure remained months away.[147] David Weston, who served at Eureka, Alert, and Mould Bay during the late 1960s and early 1970s, recalled similar countdowns to departure.[148] The first sighting of the sun in late February or early March was a time of great celebration. "Even for the strongest, there is no more welcome sight than the reappearance of the sun in March," *Collier's* magazine described. "The men dance and sing and drink their meager supplies of beer and whisky. There is an exhilarating feeling of having triumphed over nature when you have emerged alive from the horror of constant night in the arctic."[149] For a few personnel, the moment was less sublime. Lowell Demond remembered one peer who, while observing the first sunrise of the new year outside, unzipped his pants and relieved himself. When he was finished, he remarked: "I went out to pee at sunrise and didn't finish until after sunset."[150]

"As much as field stations are imagined as islands in geographical space," Wenzel Geissler and Ann Kelly observe, "they are seen as islands in time, where the temporalities of nature can prevail, in juxtaposition merely to most essential human rhythms of sleep and nature."[151] As much as quotidian routine provided temporal benchmarks for JAWS personnel, they also conceptualized the passage of time through the High Arctic seasons, which dictated the tempo and forms of particular practices. Structured, synoptic scientific observations — the stations' *raison d'être* — had to be completed regardless of weather conditions and constraints, and the broad timing and form of major resupply operations, construction work, and visitors from the south passed each year with celestial regularity. But daily and inter-seasonal variability, unpredictable shifts in local conditions, technological fallibility, and the limitations of scientific knowledge meant that station personnel knew better than to plan anything in the

High Arctic with absolute certainty. As they rotated through the seasonal cycle, the men accepted and resisted environmental constraints. Wind, fog, the firmness of the permafrost, and the thickness of ice determined whether aircraft could land. Naval vessels trying to access the sites operated at the mercy of ice conditions. Summer saw a flurry of activity, as additional technicians and labourers came in to help accomplish key goals before the return of colder conditions and darkness closed the window of opportunity. When the last visitors and transient workers departed with the fall clean-up flight, station life was confined to the core group of overwintering JAWS personnel who adopted routines and rhythms of life suited to the coldest, darkest season.

In 1952, R.W. Rae reported that "the darkness alone is not especially trying; but the darkness, the cold, the isolation and the same faces around the dinner table day after day, are all ingredients of an insidious acid that eats away at the individual's sense of humour."[152] Even when the dark period ended, other irritants that Rae noted could undermine station morale and inflame tempers year-round. Circumstances dictated that JAWS personnel had to learn to capitalize on the opportunities provided by each season in the High Arctic. Strip mechanics learned to wait for the right ground temperatures during the spring and fall before working on runways. Personnel at Isachsen and Eureka waited for the fall to harden the sea ice before harvesting icebergs for their winter water supply. They ate more canned goods during the winter when the stations were most isolated and caught up on interior improvements and repairs when bitter cold and wind constrained outdoor activities. Recreational activities also shifted with the seasons, as did concomitant interactions with flora and fauna.

The place of the stations — their spatiality — dictated that JAWS personnel learn how to work within, and take advantage of, the seasonal cycle. These accommodations allowed the program to succeed, creating safe and reliable scientific outposts on the edges of Canada's Arctic Archipelago which, over time, supported additional scientific facilities and transient scientists at specific times of the year. Coping with these challenges, however, required more than technological advancements and a willingness to adapt to local environmental conditions. Developing successful scientific outposts also necessitated robust station cultures capable of negotiating isolation, confinement, and the program's complex binational command structure.