Wireless and the *St. Roch*: 1928—1950

The epic journeys of the Royal Canadian Mounted Police (RCMP) schooner St. Roch are well documented. She was captained by Henry Asbjorn Larsen for almost all of her life, and the voyages were highlighted by the two-way transit of the Northwest Passage in the 1940s. Later, having transited the Panama Canal, she became the first vessel to circumnavigate North America. An untold story of the famous vessel is her use of wireless, known as radio after about 1931.[1] *Launched in 1928, the St. Roch would have been among the first to be equipped with new shortwave or high frequency (HF) equipment. Sailing in both the Western and Eastern Arctic during the years 1928–50, the ship had first-hand experience of shortwave wireless as it evolved in the Canadian Arctic. The use of shortwave in the Arctic had been pioneered by Tom Mix on the American ship Bowdoin in 1923. Canadian Jack Barnsley, in Prince Rupert, BC, provided vital communications support for the Bowdoin. Inspired by this example, Commander C. P. Edwards, Canada's leading wireless authority, arranged for Captain Bernier to take on 20-year-old Bill Choat as his radio operator on the ship CGS Arctic for its annual voyage in the Eastern Canadian Arctic in 1924. Bill Choat's task was to use and experiment with this new technology. These voyages provided proof of concept of shortwave, and by 1928 it was chosen as part of the equipment to be installed on the St. Roch. J. Lewis Robinson, in his 1945 article "Conquest of the Northwest Passage by RCMP Schooner St. Roch," wrote "Aided by modern equipment and radio communication, the RCMP boat has been performing feats of Arctic ice navigation equal to those history-making voyages of less than a century ago." This is the radio communication story of the St. Roch.*

General

A full history of communications in the Canadian Arctic is beyond the scope of this article, but part of that history shapes the *St. Roch* experience. The peculiarities of Arctic communications meant that "local" communications were often with stations many miles away. Stations such as Aklavik, Coppermine, Resolution Island, and Churchill were just becoming established as the ship began its first voyage in 1928. Guy Lawrence, writing about the introduction of wireless into various section of the Yukon Telegraph, noted that "Short or continuous waves had earned respect on land, even in mountainous districts. If successful [on the Yukon Telegraph lines] it would eliminate delays in transmissions and… would save lives as time ran on. …from the first it was successful, although waves had a habit of skipping. Signals from Hazelton to Atlin or Telegraph Creek might be picked up in the furthermost

corners of the earth but yet not reach either of these places being transmitted to."[2]

In the 1920s, communications in the Western and Eastern Canadian Arctic developed in totally different ways. In the West,[3] the telegraph service in the Yukon Territory, which had begun in the late 1800s, was being challenged by the new wireless technology. Wireless had been in the public eye since 1902, when the government had funded Marconi to the tune of $80,000 to build a wireless station at Table Head in Cape Breton, Nova Scotia. An attempt in the early 1920s to replace part of the telegraph service in the Yukon by wireless floundered initially on the question of tariffs and doubts about the reliability of wireless. Notwithstanding these concerns, late in 1922 a petition signed by business leaders in the Northwest Territories was sent to the Prime Minister. The petition argued that "this territory is on the eve of development.… Wireless communication would revolutionize the transportation business and all commercial projects."[4]

Reacting in part to the petition, the Department of the Interior contracted with the Department of National Defence in 1923 to set up a wireless system in the North. This became the responsibility of the Royal Canadian Corps of Signals (RCCS). The system was born on October 20, 1923, with the opening of the station at Dawson, Yukon. The station at Aklavik, established in October 1925, and the summer station on Herschel Island, established in 1926, were to become crucial to the mission of the *St. Roch*. Other stations were added to the Northwest Territories and Yukon (NWT&Y) network, as it became known; "By the end of 1933 the System had grown to 12 year-round stations with the summer station at Herschel Island."[5]

Herschel Island, in the Beaufort Sea, the Yukon's most northerly RCMP detachment, was to become home base in the Arctic for the *St. Roch*. It had initially been established to monitor the declining whaling industry, and by the mid 1920s the duties of the detachment covered a wide range of government responsibilities in addition to its key role of police duties. Plans for the NWT&Y system in 1924 included an installation at Herschel Island. To accomplish this, a communications contingent traveled by train and ship to Herschel Bay, while equipment was separately shipped north from Vancouver on the Hudson Bay Company (HBC) steamer *Lady Kindersley*. The communications contingent made it, however the ship sank near Point Barrow, Alaska, and the equipment was lost. Among the communications contingent sent to Herschel Island to await the arrival of the equipment was Corporal (later Major) Frank Riddell, who will be mentioned later. By 1925, it was clear that Aklavik would be the best northern terminal station, while Herschel was downgraded to be a substation during the few weeks per year that navigation there was open. Aklavik Radio Station opened with a 500 watt SITD transmitter and a SITD 2 receiver.[6]

While the Herschel station was only to operate as a substation of Aklavik during the annual six weeks of reliable navigation, it remained important to

the RCMP. They had offered to provide radio operators for the station, including arranging for their training at the National Defence School at Camp Borden. Then in 1928 they concluded that the station should remain open so that the officer commanding RCMP Western Arctic at Herschel could communicate with the *St. Roch*. But by the time the *St. Roch* made its inaugural voyage, the station at Herschel Island had adopted its new "summer" role. By 1930, when the *St. Roch* was due to arrive on its second voyage, the costs of the station were to be covered by the Department of Marine and Fisheries. In 1931 the station was operating on a frequency of 193 kHz (1,554 meters) under the call sign VEE. The station did not survive; in 1938 it was closed, and the equipment moved to Aklavik.[7]

The use of communications in the Eastern Canadian Arctic developed more gradually. On June 23, 1923, the MacMillan Arctic Expedition ship *Bowdoin* had left for the Arctic from Wiscasset, Maine. The radio operator was Donald H. Mix, and the ship was equipped with a complete Zenith installation. Operating under the callsign WNP, the ship pioneered shortwave communication in the Arctic, overwintering at Refuge Harbour in Greenland. In these early days, relay tests were being carried out to transmit messages from one side of the country to the other. Jack Barnsley, 9BP, in Prince Rupert, BC, operated the most northerly relay station during the Trans-Canada Relay Tests. A weekly story was to be sent from the *Bowdoin* to the North American Newspaper Alliance in New York City. Because of the peculiar "skip" phenomena mentioned earlier, Barnsley was in a unique position to relay the ship traffic, press stories, and hot news, such as the World Series scores. He became the most reliable clearinghouse for traffic to and from the ship. For his efforts he was presented with a complete Zenith receiving set.[8] His antenna was a "cage" 75 feet long. We will see a similar "cage" on the *St. Roch* later.

The Canadian Government Ship (CGS) *Arctic* sailed from Quebec in July 1924 on her annual trip to Baffin Bay and the Canadian Arctic Islands. Master of the vessel was the famous Canadian Arctic explorer Captain Bernier. Commander C. P. Edwards had arranged for Bill Choat of Toronto to be the radio operator for the voyage. The ship carried a shortwave interrupted continuous wave outfit, transmitting on wavelengths between 100 and 150 meters under the call sign VDM. The test transmitters (see Fig. 1) were two Admiralty units using Marconi MT6 tubes, with 2 kW input to the plate; the tone, to be distinctive, was set at 480 Hz. Choat, whose call sign was Canadian 3CO, was to report to the Radio Branch, Department of Marine. Canadian radio amateurs were given specific authorization to use 120 meters to communicate with the ship. These trials benefitted from the *Bowdoin*'s experience in 1923, during which year the two ships had met at Etah in Greenland. Choat used the three 80-foot masts of the *Arctic* as the anchor for his antennas. He also installed a ground connection of 200 feet of copper plate secured to the side of the ship. The experiments were a success.

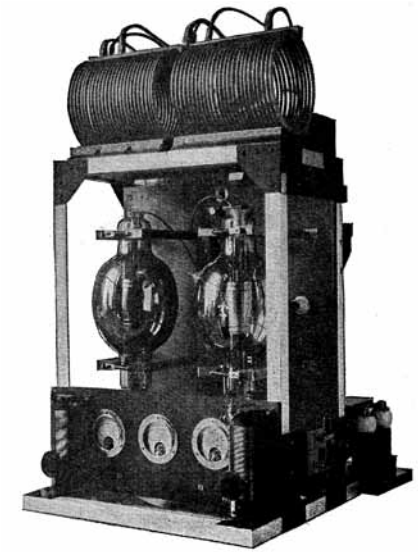


Fig. 1. Admiralty transmitter used on the *CGS Arctic* in 1924. (*QST*, Dec. 1924, p. 39)

Among other contacts, Choat mentioned the CW telegraph signals from station 8XS (KDKA), of which more will be told later. During its long Arctic sojourn starting on August 17, 1924, the ship spent nine days at Dundas Harbour while the police post was being built there. No doubt this cemented the close working relationship between the Radio Branch and the RCMP, which lasted for the life of the *St. Roch*. In his report to the Radio Branch, Choat concluded that, properly managed, shortwave was preferable to commercial longwave for ship-to-shore communication–a factor which influenced Commander Edwards when the time came to outfit the *St. Roch* in 1928.

Construction of the Hudson Bay railway and the port of Churchill, Manitoba, was a major project in the late 1920s. Ships using the port of Churchill would have to pass through Hudson Strait. During 1927–28, the Hudson Strait expedition undertook research into the navigation conditions through the strait. The expedition's innovative use of radio led to the opening of radio facilities in the area. Bases had been established in 1927 at Port Burwell, Wakeham Bay, and Nottingham Island. At the end of the expedition, the equipment was transferred to the Radio Branch, and the Wakeham Bay station was closed. In 1928, while the *St. Roch* was getting ready to leave on its inaugural voyage, permanent stations were being built at Nottingham Island (VCB), Cape Hope's Advance (VAY), and Resolution Island (VAW). While there was some customization to fit local conditions, the basic equipment for each station was a 50 watt transmitter with Kohler generator, a Marconi Type M.S. receiver, and a Marconi G3 direction finding receiver.[9]

Radio Broadcasting

At first glance, a small ship operating in the Arctic as a broadcast station seems an anomaly. But the RCMP had been an early adopter of broadcasting. Morrison notes that a wireless antenna was put up in the police detachment at Port Nelson as early as February 1914. Sergeant R. H. Walker, commanding the detachment, commented that they were able "to receive the daily news from Cape Cod, and an occasional message from Virginia. This is a great boon here, as we receive the news before it is published in the papers in civilization."[10]

Shortwave radio programs from radio station KDKA in Pittsburgh were highly

popular in the 1920s with southerners serving in the Arctic, although it would be many decades before such services were geared to the needs of traditional residents of the North. Throughout the 1920s, an increasing number of people in the Arctic had shortwave receivers, including many RCMP posts. A survey was carried out to assess the potential of shortwave services, and on September 16, 1927, RCMP Commissioner Cortland Starnes wrote to Commander C. P. Edwards, head of the Radio Branch, with the results of the survey. This included a report from then Staff Sergeant Joy on Ellesmere Island (see Fig. 2), at that time the most northerly location, which ran to dozens of pages.

The following February, George A. Wendt, of Canadian Westinghouse in Montreal, wrote to Edwards announcing the availability of a new receiver suitable for posts in the North. Later that year he submitted a Radio Broadcast Schedule for 1929–30. From this time on, radio broadcasting became an important feature of the Arctic. This was further enhanced when, in the mid-1930s, the newly formed Canadian Broadcasting Corporation began its Northern Messenger Services (Messenger), which allowed people to send messages to friends and relatives in the North.[11]

When the Department of Marine Radio Branch was amalgamated with the new Department of Transport on November 2, 1936, a number of ongoing responsibilities were formally acknowledged. This appears in the first Annual Report of the Radio Branch 1936–37.

Fig. 2. Alexandra Fiord, Ellesmere Island. Broadcast signals reported from here in 1927. Note the radio frequency (4356 kc) spelled out in white stones, although viewed from shore this is upside down. (Author's collection)

Special Broadcasts in Subarctic Regions

In the early 1930s, arrangements were made for the department's stations at Coppermine, Coronation Gulf, Chesterfield Inlet, and Port Churchill, Hudson's Bay; and the Royal Canadian Mounted Police schooner *St. Roch*, to broadcast at scheduled hours for the benefit of trading posts, settlers, miners, and missions within range. The broadcasts, which consisted of press, personal messages, etc., were transmitted by voice in accordance with the schedule shown in Table 1.

Practical Limitations of Shortwave (HF) radio

Radio communication in the Arctic is constrained by a number of natural phenomena. Over the long term, the range of communications is subject, as in the rest of the world, to the sunspot cycle,[12] but the effects are more severe. At the low point in the cycle, the higher HF frequencies are unusable, leaving it to the skill of the radio operator to select the best of poor options at lower HF frequencies. The *St. Roch* was fortunate to experience generally good sunspot conditions during her critical voyages. Compounding the issue, in the short term the aurora and other factors can cause radio "blackouts,"[13] when HF communication is impossible for days on end. But even during the worst conditions, the high-power Rugby radio station, at 16 kHz, could still be heard. Radio signals would often exhibit a characteristic "Arctic flutter" and be subject to fading.

By 1928, shortwave had come into its own, and the days of spark had officially come to an end.[14] Stations were assigned crystal controlled frequencies that could be selected by the operator, depending on conditions; this meant that they transmitted on pre-assigned frequencies and anyone with a proper receiver could tune them in. Table 2 shows the frequency assignments of three stations of importance to the *St. Roch*.

Table 1. Voice broadcast schedule.

Location	Call sign	Frequency	Wavelength	Times
Coppermine	VBK	571 kHz	525.0 meters	11:05 p.m. Wed–Sat
Chesterfield Inlet	VBZ	555 kHz	540.5 meters	10:00 p.m. Tues–Fri
Port Churchill	VAP	555 kHz	540.5 meters	11:00 p.m. Mon–Thurs
St. Roch	VGSR	667 kHz	450.0 meters	11:00 p.m. Wed–Sat

Table 2. Frequency assignments of stations important to** St. Roch**.

Call sign	Location	Frequencies (MHz)
VAA	Ottawa	6.375, 6.690, 6.777, 6.837, 13.360, 13.675, 15.820
VAP	Port Churchill	6.690, 6.837, 13.675
VAY	Cape Hopes, Advance	6.690, 6.7775

Wireless on the Voyages of the *St. Roch*

On March 31, 1926, the expenditure of a price not to exceed $37,500 was approved for an "auxiliary schooner for the use of the RCMNP [the earlier title of the RCMP] at Herschel Island, YT." The tender from Burrard Dry Dock Co. for the construction of the schooner was confirmed on September 29, 1927.[15] Stuart Taylor Wood, later commissioner of the RCMP, was responsible for the building of the *St. Roch* and continued to take a personal interest in the ship and its activities throughout her life.[16] He knew the North well, having lived in the Yukon as a young man, and later as commanding officer of the Western Arctic from 1919–1924. The years of the *St. Roch* were marked by the financial constraints of the Great Depression and the war years. The success of the ship's mission depended on strong and supportive leadership, and in this she was blessed with its long-time captain, Inspector Henry Larsen, three RCMP commissioners (Starnes, MacBrien and Wood), and Lt. Commander C. P. Edwards, (see Fig. 3) head of the Radio Branch in the early days.[17]

The *St. Roch* was designed as a supply vessel and floating detachment for the Arctic and was launched at the end of May 1928. A map of her voyages may be seen in Fig. 4.[18] Her wireless facilities were the responsibility of the Radio Division of the Department of Marine and Fisheries, and the radio equipment was initially purchased along with other supplies and equipment such as tarpaulins, rubber boots, and photographic

Fig. 3. Lt. Commander C. P. Edwards, longtime head of the Radio Branch. (Radioalumni .ca)

supplies. Batteries for the first radio set were ordered under a separate purchase order. A standard order for all purchases commanded "strict economy is to be exercised in the purchasing of these supplies."

The wireless story of the *St. Roch* falls naturally into three time periods. The first period was the decade 1928–38, before the Northwest Passage voyages, which covers a period of severe spending restrictions. Radio operators were called on to innovate and adapt to Arctic conditions. The second period covering the next five years, 1939–45, the years of WWII and the epic Northwest Passage voyages, the vessel followed well-established patterns but was restricted by the financial constraints of the war effort and by limitations imposed on communications by radio silence. The third period concluded with a voyage back to Vancouver captained by Henry Asbjorn Larsen, where the ship became a National Historic Site at the Vancouver Maritime Museum.

The Years 1928–39

The maiden voyage of the ship, sailing from Vancouver on June 28, 1928, and wintering at Langton Bay, east of Herschel Island (see Fig. 4), tested the wireless equipment and set the pattern for future voyages. The basic wireless set had already been purchased, but the installation of the set, the antenna, and the tools and supplies needed to keep it running,

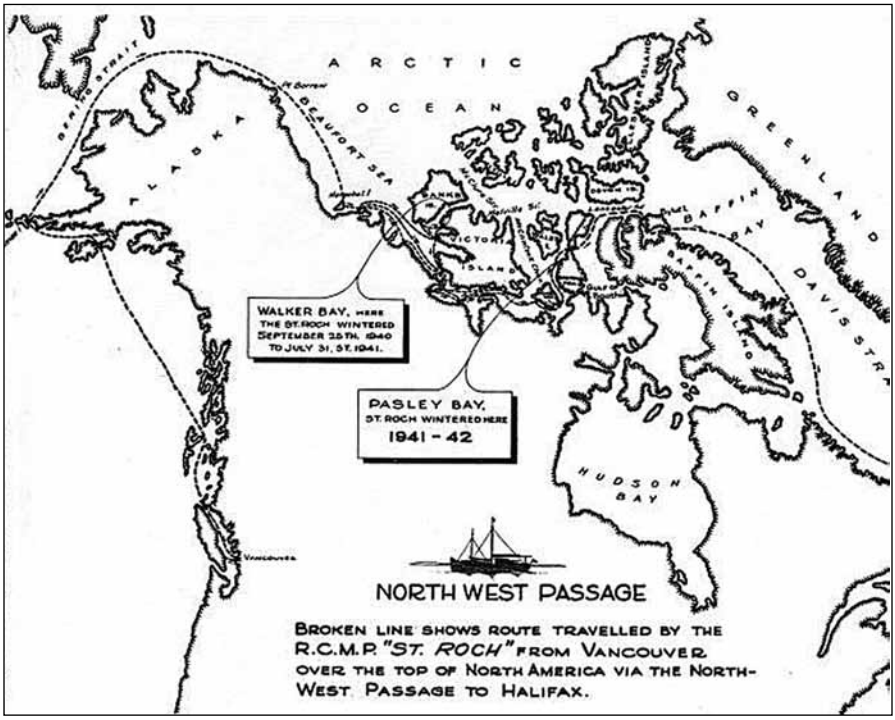


Fig. 4. Map showing wintering-over places for the *St. Roch*. (Author's collection)

had to wait until the arrival of F. W. "Fred" Sealey. Selection of the ten-man crew was underway in May 1928. Sealey, from the Radio Branch of the Department of Marine, was the last to arrive, on June 7, 1928. He had previously been a Marconi operator, having sailed with the *Robert Dollar* between Vancouver and Yokohama, Japan. By the time he arrived, there was a hectic rush to get the ship ready to leave. Sealey ordered what he could, including a typewriter, essential for an operator copying Morse code, but also useful for administrative duties on the ship. The June 28 date was fixed to allow the vessel time to navigate through the Arctic ice and around Alaska. With a scant three weeks before sailing, there simply was not enough time for everything that needed to be done.

Sealey's primary responsibilities were passing messages about the ship's business and communication with shore stations on navigational matters. His official duties, and those of all subsequent operators, were to:

"Carry out his duties and watches under the direction and control of the captain, who will check all messages sent and be handed copies of all messages received," and "He will be responsible for all stores and spare parts issued to him, and will keep a record of all replacements."[19]

Larger vessels, and land stations, had at least two operators to cover the 24-hour cycle. There was only one operator on the *St. Roch*, although on some voyages another member of the crew could substitute in an emergency. It was impossible for the operator to be on duty all the time, but he would be on duty for scheduled communications or "skeds" with other Arctic stations and headquarters.

As was the practice at all northern stations, "other related duties" were part of everyone's responsibilities. On the *St. Roch*, the radio operator was expected, as a member of the crew, to take turns on watch and to share in the day-to-day chores around the ship. The substance of communications would, of course, have changed each year to reflect current conditions. The following highlights of Sealey's experience would have been typical for subsequent voyages of the ship.

One of Sealey's responsibilities was monitoring the news. The loss of Northwest Passage pioneer Roald Amundsen was of great interest to Larsen and the crew. Amundsen had been hunting for the airship/dirigible *Italia*. Under its leader, Umberto Nobile, it had crashed on May 25 while returning from a flight to the Pole. Sealey tracked the news as it unfolded and reported to the ship's crew when parts of Amundsen's plane were found later in the summer.

When they entered the Bering Sea, Sealey had to provide advance warning of the ice conditions ahead. He contacted the steamer *Victoria*, then at Nome, Alaska, to learn that ice conditions were unfavourable to proceed. It was decided to layover at Dutch Harbour, where they waited for three days until Sealey made contact with the *Boxer,* which reported that the Bering Strait was free of ice. After entering the Bering Strait and crossing the Arctic Circle, Sealey was in contact with other ships and with Point

Barrow. They were able to proceed to Barrow and thence into the Beaufort Sea around July 27, in time to see the sun set for a few minutes at midnight. On July 30, they passed Demarcation Point and re-entered Canadian waters, where they anchored at Herschel Island.[20]

During the voyage to Alaska, Sealey had maintained two wireless schedules a day, but by the time they arrived at Herschel Island on July 24, the repercussions of their hectic departure from Vancouver had caught up with them. Their radios had been unserviceable for days, and no doubt Sealey was eager to find supplies and test gear at Herschel to fix the problem. Not being able to contact Herschel by radio, they did not learn until they arrived there that a major influenza epidemic had devastated the area, with many having died as a result.

From Herschel they headed east. Larsen mentions in his biography that when they reached Cambridge Bay on Victoria Island, Amundsen's old ship *Bay Maud* was anchored in the bay. Larsen commented: "I found it sad to see Amundsen's fine ship as just another floating radio station." Sadly, no record has been found to elaborate on this piece of radio history.

On August 28, future superintendent Henry Larsen[21] was officially appointed skipper and chief navigator of the vessel (see Fig. 5). He remained her captain for most of the remaining life of the ship. He selected the ship's radio operators, and his autobiography and memoirs reveal strong support and appreciation for the operators and equipment. Larsen gained a reputation as an outstanding Arctic navigator, and after bringing the *St. Roch* out of the Arctic in 1948, he followed a highly successful career as superintendent with the RCMP, retiring in 1961.

Fig. 5. Henry Larsen, long-time captain of the *St. Roch*. (Photo provided by Doreen Riedel Larsen)

Langton Bay, a protected harbour, had been chosen as winter quarters. They were able to winter-in early, built a frame for the ship's deck, and stretched canvas over it. In mid-October, when they were frozen-in, Sealey would have run antennas out onto the ice. As the only radio operator, and theoretically on duty 24 hours a day, he would have taken the rare opportunity to explore the surrounding land. He and Larsen went on such a hike, during which a strong wind came up, and

they were unable to regain the ship. They had to take shelter in an earth cave until getting back in contact with the ship the following day.

Sealey established the practice of contacting headquarters and exchanging messages with other posts throughout the North, and this was followed by successive operators. At first, he was not able to communicate with Aklavik because of the "skip" phenomena noted earlier, but could communicate with Nottingham Island, 1,100 miles away in Hudson Strait. Messages were then sent to Ottawa via that route.[22] Sergeant Anderton, Officer in Charge of the *St. Roch* detachment while in the ice, had Sealey send his end-of-the-year (1929) report by radio to headquarters. Instructions came back from headquarters via Aklavik to the ship. An example of such an instruction, in February 1929, was to send out a patrol to search for two trappers who had not been heard from.

On February 7, 1929, Sgt. Anderton wrote to the commanding officer on Herschel Island with a glowing report of the radio programs heard on their Northern Electric broadcast receiver over the winter. Radio station KDKA was the most reliable, and radio station CKY, Winnipeg, was consistent. They were using an aerial of about 20 feet taken from the masthead to a 16-foot pole on the ice. Use of the radio was limited; they had not been able to consistently charge the wet cells and Fuller inert cells as the auxiliary engine could not be run continuously.[23]

Monitoring other stations was an important part of maintaining contact with ongoing events. Sealey was able to intercept news from Aklavik about the winter mail, and arrangements were made to pick up the mail for the ship. Good news often came by radio; for example, Henry Larsen heard that he had been promoted to corporal as of the first of April.

Listening to radio broadcasts was a major leisure-time activity for the ship's crew. At different times there was a radio receiver in the forecastle and the radio room, and this kept them up to date with news from the outside world.

The *Annual Report of the RCMP* (1930) states: "Broadcasts not of a confidential nature were broadcast from *St. Roch* at Langton Bay to detachments." It further comments: "Two-way communication between settlements in the North is perhaps not far distant."

While Sealey was the sole official radio operator on board the ship, Terry Parsloe, a radio amateur, was also a crew member on this initial voyage. He was to spend several years at Bernard Harbour in Coronation Gulf, from where he kept in touch with the *St. Roch* when she overwintered in Tree River in the early 1930s.

After the ship returned to Vancouver, arriving on September 23, 1929, Fred Sealey left, but his recommendations for improvements were implemented during the refit. A new wireless room "aft of the companionway" was built, resulting from Sealey's report that the radio room leaked and was small, dark, and noisy.

He was then appointed as the first officer in charge of the new station at Coppermine, from where he made more suggestions for communications in the

Arctic. Sealey later became a radio inspector and retired as head of the DOT district office in Victoria in 1967. During 1930, Larsen mentions a radio hut at Coppermine but its history is not known.

When the *St. Roch* left on its second, and longest voyage (1930–4), the radio operator was Herbie Holt. Unfortunately, he contracted appendicitis and returned to Vancouver when the ship reached Dutch Harbour, Alaska. Crew member Jim Davies acted as radio operator until the ship reached Herschel Island, where they waited for the new operator, John Duke, to join them. He arrived, having travelled part of the way by plane, and the ship left immediately on a patrol and resupply mission. Their summer duties completed, they arrived on September 18, 1930, at Tree River, or Kuulugaaluk, on Coronation Gulf, some 80 miles east of Coppermine, where they spent the next four winters. Once they were frozen-in for the winter, they put up the masts for the radio and stretched canvas over the entire ship.

John Duke kept a diary documenting his radio work, his occasional fishing trips for dog food, his visits with Fred Sealey (by then at Coppermine), and visitors to the ship. Visitors such as Richard Finnie,[24] and perhaps also crew members, had to pay tariffs to use the radio. Duke mentions going ashore at Coppermine to settle the accounts.

On October 1, 1930, Duke began taking weather observations. Two-way communications to this point had only been CW, but having set up regular schedules with Aklavik (VEF) and Coppermine (VBK), he began testing voice communications. He also copied the press to bring news to the crew, and on October 6, 1930, noted hearing about the R101 crash, one of the worst airship accidents of the 1930s. During this time he was in radio contact with Frank Riddle, VEE, at Herschel Island.

On October 16 he mentions playing chess. Later, playing chess by radio was one of the leisure activities on the ship. Once his antennas were set in the ice, Duke began contacting radio amateurs, initially in Canada and the United States. From November 10, 1930, radio amateurs in western Canada relayed messages from the ship to family members in the south. Often, these amateurs were located in the hometowns of crew members. Charlie Harris, in Edmonton, who dealt with much of the traffic, was still handling northern traffic into the mid-1950s.[25] Duke's crystals would have meant transmitting outside the amateur bands and, as was the practice at the time, working cross band (transmitting and receiving on different radio frequency bands) with amateurs.

Duke continued with the radio broadcasts "not of a confidential nature" begun by Sealey at Langton Bay. He refers to these as "phone schedules," perhaps to differentiate them from public broadcasts. Duke would copy news from CW circuits. Crew members, such as A. H. Owen-Jones, would then "broadcast" commentary and play music, perhaps using the ship's gramophone. These "phone" transmissions were made several times a week at 2 p.m. and 7:55 p.m.

Duke, who had arrived in the North by airplane, made a point of noting plane

arrivals and departures there. For example, on March 9, 1931, Wop May arrived by plane at Coppermine. On March 18, the first winter plane left Aklavik. Duke was later associated with King Edward High School in Vancouver, well known for its courses to prepare students to become radio operators on board ship. Jim Davies took over the radio duties again for the 1933–34 season, after which the ship returned south.

The years 1935–37 saw the *St. Roch* head back into the Arctic, wintering for two years at Cambridge Bay with Tommy Welsh as the operator. During these years, radio networks such as the Hudson's Bay Company (HBC), the RCMP, and government networks expanded in the Arctic and some became outstations of the NWT&Y network. "Almost all traffic handled to and from them was by voice as it was extremely difficult to procure capable civilian Morse operators willing to work in such remote areas…."[26]

The extensive HBC radio system in the Arctic was started and maintained by Donald Graham Sturrock (1914–1943). He set up a radio station for company use at Cambridge Bay in 1934 and used it to communicate with the government radio station at Coppermine. Sturrock was in regular contact with the *St. Roch* and played chess over the radio with the crew.[27] Sturrock enlisted when war was declared and, sadly, was reported missing and presumed killed on May 29, 1943.

The importance of the radio for keeping in touch with families is highlighted in Henry Larsen's autobiography, where on November 6, 1935, he reports Tommy Walsh delivering a telegram with the news that he was a father–his daughter Karen Doreen having been born two days before in Vancouver.

In July 1936, for the first time, the Commissioner of the RCMP, Sir James MacBrien, travelled into the far north by small floatplane and visited the ship. He showed great understanding of the problems faced in the Arctic. While no decisions were taken, the idea of the *St. Roch* completing the Northwest Passage, a long-standing personal interest of Henry Larsen, was broached during his visit.[28]

Ice conditions varied from year to year, but the summer of 1937 was particularly bad and radio was to play a big role. The ship was in a critical situation in Coronation Gulf when they learned that the HBC ship *St. James* was in difficulty. The two ships managed to get loose and were drifting together. The *St. Roch* survived but the *St. James* sank on August 6, and the crew of the *St. Roch* came to their aid.

For the 1938–39 season, the ship was again sent to Cambridge Bay, with radio operator V. R. Josephson, but the ship was recalled to Vancouver with the outbreak of World War II.

The War Years 1940–1945

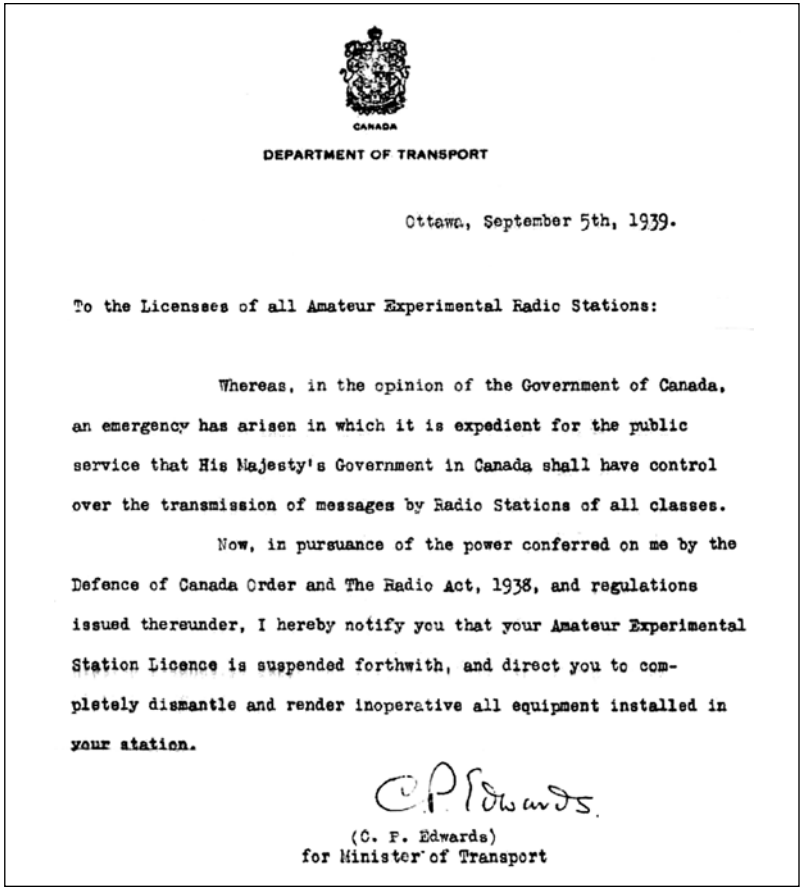
During the war years, the *St. Roch* accomplished its epic Northwest Passages as well as a short supply mission in 1943 in the Eastern Arctic.

Leaving Vancouver on June 9, 1940, the radio operator for the west-east transit was 21-year-old Edward "Dean" Hadley,[29] the youngest member of the crew. He was also the detachment clerk, whose

duties included managing the paperwork associated with the detachment and keeping track of stores. The radio cabin was "aft [of the cabin for the skipper and the detachment office]. On the port side was the companion-way to the aft quarters and the radio cabin."[30]

The radio situation for the five war years was quite different from that in the earlier period. In 1939, C. P. Edwards had sent out a directive shutting down amateur radio for the duration of the war (see Fig. 6). Further, radio silence was imposed on users of radio communications, although this does not appear to have been seriously enforced in the Arctic. It is unclear how much communications were permitted for the *St. Roch*. During 1942, the RMS *Nascopie* was sailing in the North and was said to be under mandatory radio silence. The HBC posts were not regulated, however, on the theory that the Axis powers already knew where they were.[31]

The winter of 1940 was spent frozen-in at Walker Bay, from where Hadley



CANADA

DEPARTMENT OF TRANSPORT

Ottawa, September 5th, 1939.

To the Licensees of all Amateur Experimental Radio Stations:

Whereas, in the opinion of the Government of Canada, an emergency has arisen in which it is expedient for the public service that His Majesty's Government in Canada shall have control over the transmission of messages by Radio Stations of all classes.

Now, in pursuance of the power conferred on me by the Defence of Canada Order and The Radio Act, 1938, and regulations issued thereunder, I hereby notify you that your Amateur Experimental Station Licence is suspended forthwith, and direct you to completely dismantle and render inoperative all equipment installed in your station.

C P Edwards

(C. P. Edwards)
for Minister of Transport

Fig. 6. Suspension of amateur radio licences September 5, 1939. (Radioalumni.ca)

regularly exchanged communications with Bill McLean, the DOT operator at Coppermine (VBK). Without amateur radio, personal messages were also sent, but paying for them was a problem. Hadley wrote: "I charged the cost of the personal messages to my personal account with the Bank of Montreal and collected from the crew when we got 'outside.'"

Radio broadcasts, both reception and transmission, were an important part of Hadley's work on this voyage, particularly in the winter of 1940. The news from Europe was of great interest to those crew members with family connections in European countries.

The *St. Roch* still held its broadcast licence, VGSR, and would broadcast occasional news and music on 670 kHz. Although there was no regular schedule, listeners would be forewarned by shortwave that there would be a broadcast. The Northern Messenger Service could be heard on Saturday evenings. Messages could be sent to Churchill, Manitoba, and retransmitted over land lines to the outside. Brief one-minute messages could be sent via Messenger and the crew could hear familiar voices from the south on board the ship.

Connections with family were particularly welcomed at Christmas, and on Christmas Day, 1940, the climax of the simple celebrations aboard the *St. Roch* came when Dean Hadley began picking up messages on the ship's radio. Sgt. Farrar wrote: "Each of us heard a recorded message from someone we knew."[32]

Larsen had made every effort to complete the eastern voyage through the Northwest Passage but the ice won the battle, and on September 11, 1941, "Preparations were then made to spend the winter in Pasley Bay, close to the North Magnetic Pole on Boothia Peninsula, and the news was radioed outside."[33]

During the winter of 1941, frozen-in at Pasley Bay, their official work, managed by radio messages, continued. For example, they received orders to carry out a census of the region during the winter. Radio communications with other stations in the Arctic was important. For example, in January 1942 they received a message that John Friederich was leaving from Cambridge Bay to visit the ship in Pasley Bay. A month later, when he had not arrived, Hadley, monitoring messages between Cambridge Bay and Ottawa, learned that Friederich had appendicitis–the major fear of anyone who lived in the Arctic. A plane was found in Ontario, which homed in on the radio signal at Cambridge Bay, and Friederich was flown to Fort Smith, where he was operated on and subsequently recovered.

Once free of the ice in the summer of 1942, the ship completed its transit of the Northwest Passage, arriving in Halifax, Nova Scotia, on October 11, 1942. The winter of 1942–43 was spent in Halifax, and in 1943 the ship took on a three-month voyage of supply to RCMP detachments in the Eastern Arctic.

In preparation for its 1944 voyage, returning to Vancouver via the northern route of the Northwest Passage, the *St. Roch* went through a refit at Dartmouth, NS, sixteen years from its launch date. Despite the financial restrictions of the war, a much larger deckhouse

and individual cabins for the crew were constructed, as well as an upgrade of the power plant and the installation of navigational equipment. They sailed from Dartmouth shipyards on July 19, 1944. By now electronic direction finding had become part of the navigation aids on the vessel. On this trip, Larsen mentions, around August 2, 1944, they obtained a radio bearing from Resolution Island (a station they had contacted in the 1930s from Tree River). Having reached Holman Island on September 4, 1944, "Larsen received radio instructions from Ottawa to proceed outside to Vancouver and to complete the coast-to-coast voyage if he could."[34]

Some of the correspondence from the *St. Roch* was sent via one of the land stations over public communications circuits. An example is a message sent via Coppermine on September 6, 1944. Numbers were substituted for place names; in this case, Walker Bay was "number fifteen."[35]

Later in the voyage, when there was a danger that they might not get through, they were in radio contact with Point Barrow and learned that the ice pack was solid to the shore and that the season was the worst in years. Larsen had to weigh the information from the radio stations against his own lifetime judgement and experience—finding their way through the ice, and thus completing their amazing 86-day passage, arriving at Vancouver on October 16, 1944.

The Post-War Voyages 1945–50

Post-war, 1945–46, the ship returned from Vancouver to its old location at Cambridge Bay, arriving about the middle of September 1945, where it continued its usual duties. Log entries for their voyage around Alaska show that radio reports were becoming a useful asset, always recognizing that the navigational skills of the captain were paramount. For example, the ship's log of July 22, 1945, reads "Anchored off Wainwright, Alaska…. Wireless report from Point Barrow that heavy ice is solid at that point. Ice coming in on the shoreline at 18:00." Again, in the ship's log for July 26: "Further wireless report received from Point Barrow that heavy ice is still packed solid to the shoreline."

Henry Larsen wrote in his report about the Northwest Passage 1940–1942 and 1944: "Whilst there, we acted as a wireless station and assisted the planes as a radio beacon supporting the Exercise Muskox."[36]

Operation Muskox, carried out in the early part of 1946, was a military exercise organized by the Canadian Army involving 48 members of the Army driving 11, 4½-ton Canadian-designed snowmobiles. They were joined by three American observers in an American-made snowmobile called a "Weasel" as well as an observer from the Royal Canadian Navy and a number of scientists. The Royal Canadian Air Force provided airdrops of supplies. The mission of Muskox was to test the mobility of a small air-supported mechanized force in the Arctic in winter. The exercise team arrived at the *St. Roch* at Cambridge Bay on March 15, 1946. They stayed for about a week, changing engines and tracks on their vehicles. During this week, military

aircraft landed at Cambridge Bay and communicated with the ship on her "guard frequency" of 6.24 MHz.

One of the experts with "Muskox" was Larsen's old friend Frank Riddle, who had been a corporal in 1928 at Herschel Island, a sergeant at Tuktoyaktuk, and was now a major with the RCC. Larsen describes him as "one of the most versatile and practical men in that undertaking."[37]

Aircraft flying in the area needed a beacon for navigation purposes, and the *St. Roch* was a natural place for it. However, operator L. C. Smith was alone and could not possibly provide 24-hour service. Smith solved the problem by building a beacon. He rigged up the motor of an old electric gramophone with a contraption of a disk of plywood and pulleys using heavy rubber bands to obtain the proper speed and tension. The disk was notched with Morse characters signalling VGSR. Several of the visitors came on board to see the beacon and found it hard to believe that they had tuned in on this contraption.

This, the fourth winter spent at Cambridge Bay, was their longest and coldest. Radio operator L. C. Smith wrote of the bitter cold: "When tightening up the rivets on the boat plates, the rivets were so brittle you had to be careful with a hammer not to hit too hard as they would go right through."[38]

Larsen wrote that Cambridge Bay was changed forever that year. To meet a requirement for long-range navigation in the Arctic, the area was surveyed to find a location for Loran towers. Loran used a frequency of 180 kHz and its transmissions would follow the curvature of the earth. When operational, very tall antennas were needed, and as part of Operation Beetle, free-standing towers 633 feet high were erected at Cambridge Bay, NWT; Skull Cliff/Barrow, Alaska; and at Kittigazuit, NWT.

Smith, who continued the practice of reporting on the outside news, noted that he would search out the results of horse races in the south. He later became the operator of a horse ranch at Lac La Hache.

They left Cambridge Bay in August, and on the return trip to Vancouver, Captain Larsen was arrested and detained overnight by the Russians when he anchored off Large Diomede Island. For once radio let them down. They had been unable to communicate with the Russians by radio and had to resort to semaphore—a skill no longer known to radio operators. They arrived in Vancouver on September 26, 1946, thus completing their eleventh winter in the ice.

The ship wintered over at Herschel Island in 1947–48, having supplied detachments in the Western Arctic. Most of the crew were flown out for Christmas. On her return to Vancouver, the *St. Roch* was laid up.

On January 25, 1949, it was decided that the Naval Department, which was already overhauling the vessel, would take over responsibility for the radio equipment, bringing to an end an arrangement with Department of Transport, which had lasted since 1928.[39]

In 1950, the *St. Roch* sailed from Vancouver to Halifax by way of the Panama

Canal, becoming the first ship to circumnavigate North America.

In 1954, with Henry Larsen again in command, the *St. Roch* returned to Vancouver by way of the Panama Canal for preservation as a museum vessel.[40]

THE RADIO INFRASTRUCTURE

Power Sources

Henry Larsen, in *The Big Ship*, wrote that the original ship had an auxiliary 8 hp gas engine that was used for the wireless transmitter and smaller loads.

Batteries were charged from 1928–1943 by a 150 hp, six cylinder, four cycle, Union Diesel power plant. An auxiliary engine, a Russel Newbury diesel engine Type D2, 18 hp at 1,000 rpm, was added in 1940. It drove a 3.4 kW Pratt and Whitney generator at 1,000 rpm, which produced 110 volts at 31 amps used for battery charging. These generators carried, among other loads, one set of Hart batteries–56 cells in series–110 volt C.K.Y. type 15 plates, 14 trays.[41] A model 301 ammeter was used to monitor battery charging current. During the winters from 1940–42, they charged the batteries every five days to provide lighting and power for the transmitters.

Sixteen years after being launched, *St. Roch* was refitted at Dartmouth, NS, in preparation for her 1944 voyage. The 150 hp diesel engine was replaced with a 300 hp diesel, a battery charger was installed in the radio room, and a new battery bank on a platform in the engine room. A small gasoline auxiliary engine was used to charge the batteries. This allowed the crew to use the radios and other electrical devices without running the main engine.

Gradual improvements to the propulsion equipment of the *St. Roch* had been made by 1945. The main engine of the schooner was a Union Diesel model 55, with 300 hp, which drove the ship's main generator, a 5 kW Electric Tamper and Equipment Company, at 120 volts, 42 amps.

Equipment

Shortly after being launched, the ship was fitted with a Canadian Marconi 100W4 main transmitter and a 100 watt, medium wave (375 to 1,428 kHz) unit used for ship-to-ship or ship-to-shore work. Also installed was a 50 watt shortwave experimental transmitter; this was an HF set for communicating with stations beyond the range of the main set, such as the area around Hudson Bay, or possibly Ottawa (see Fig. 7). In the 1928 to 1932 period, three receivers were installed covering, in all, a frequency range from 15 meters to 20,000 meters. Two of these receivers were an MST tuner with MSA amplifier and a Canadian Marconi 4VSW-6 receiver. The third receiver type remains unknown. It should be noted that although the wireless equipment was state of the art for 1928, the ship lacked navigational aids (a functional gyro and an echo sounder) and was thus heavily dependent on the navigational skills of Captain Larsen.

When Sealey reported for duty on the ship in the summer of 1928, he had to prepare a requisition for radio supplies for the running of the ship's station. This included items such as spare

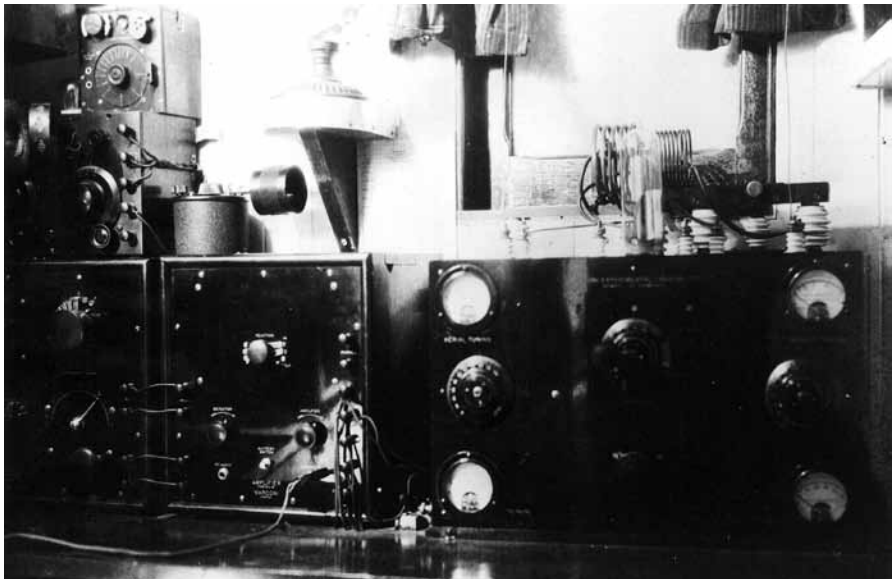


Fig. 7. *St. Roch* radio gear 1928–29. (Source: Parks Canada *St. Roch* photograph collection, HSIN-20-03)

tubes, headsets, a voltmeter, multiple plugs, insulators, lightning arrestors, copper wire, and a radio set (which one assumes was additional to the one already installed). In the same requisition he asked for four "Layerbilt B-25 batteries, 28 Fuller inert cells, and a radio loudspeaker." The next day he added more tools. For his reference library, he purchased *Radio Aids to Navigation* and a radio licence book. He later submitted a requisition for batteries and radio components for the 1929 season (see Fig. 8).

In the spring of 1936, the *St. Roch* wireless office was supplied with a General Radio model 358 wavemeter. In 1938, an order was placed for the acquisition of an HRO standard receiver to cover the frequency range of 1.7 to 30 MHz. This also included an unspecified transmitter (similar to the Marconi 200PT) to operate on 6.31 and 12.32 MHz. On the 1940–42 voyage, Hadley describes using for broadcasting a modified Marconi 100W4. A modulator was

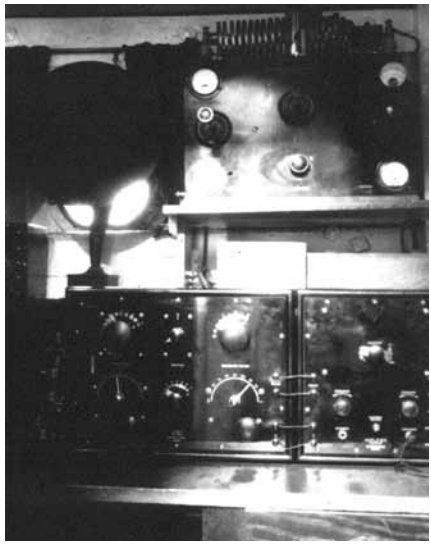


Fig. 8. *St. Roch* radio gear 1930–33. (Source: Parks Canada *St. Roch* photograph collection, HSIN-30-02)

added to the transmitter using a pair of 204 vacuum tubes.

In 1944, prior to the *St. Roch*'s west-east Northwest Passage transit, the Marconi 100W4 transmitter was replaced with the Marconi LTT-4 transmitter (which is currently installed on the ship at the Vancouver Maritime Museum (VMM)). Other equipment at this time was:

- Marconi 200PT transmitter. This was the main transmitter.
- National HRO receiver. This was the main receiver. A new Vibrapack power supply was replaced just prior to the voyage.
- Marconi 3V SW-5 receiver. This was the emergency receiver. Marconi receivers in the model range of 3V SW-x (three valve, shortwave) covered 100 kHz to 21 MHz.

In 1947, the Marconi 200PT transmitter was replaced with a Collins 32RA-8 transmitter. This then became the main transmitter until replaced with a Canadian Marconi CM11 transmitter in 1951. This was the last transmitter to be installed, and it was removed when the vessel was reconfigured to its 1944 state.

In June 1949, the Marconi 200PT-4C transmitter was decommissioned. That same month, the Marconi 150PT3 transmitter, which had been replaced by a Collins transmitter, was declared surplus. A Bendix DR-5B depth sounder was also fitted to the ship in 1951.

An LN-16 X-band radar, designed and developed by the National Research Council, was built by Canadian Marconi. The set was fitted in 1954 as a navigation aid for the trip from Halifax to Vancouver through the Panama Canal. This was to be the last voyage for the *St. Roch*.

Antennas

Photos of the ship in 1928 show it was equipped with a "cage" antenna–a conductor made of several wires held apart by wooden spreaders–popular in the 1920s and similar to the antenna used by Fred Barnsley mentioned earlier (see Fig. 9). Sealey requisitioned wire and insulators, no doubt for the antennas they intended to erect on the ice when the ship was in its winter quarters. A requisition for radio equipment specifically states that no antennas or masts were required. Given the orders that "strict economy is to be exercised in the purchase of supplies," the cost of commercial antennas may well have been prohibitive. A pair of Marconi 70 foot masts in 1921 was $1,180.

On the second voyage, John Duke went to great lengths to erect antennas while frozen-in at Tree River. After some early difficulties when his antenna masts had shifted with the ice, he described his antenna on November 1, 1930, as "Southwest pole 40 feet high, aerial 64'8½", feeders off 6'2½" from centre, spaced 14" apart" (see Fig. 10). This antenna setup lasted well into June 1931. On June 11 he overhauled the ship's antenna–lengthening the aerial by one foot and resetting the guy wires. He also installed an aerial counterpoise on deck for 23.4 meters, the ship still being in solid ice at the time. The ship left Tree River on July 14.

Hadley, from 1940 to 1942, adds another dimension to the antenna story, describing his first time up the mast to check the antennas as a "unique experience. All the things you might need to make repairs, you take with you, then

Fig. 9. *St. Roch* in 1928 showing the cage antenna. (Source: City of Vancouver Archives, public domain, AM54-54 BoN243)

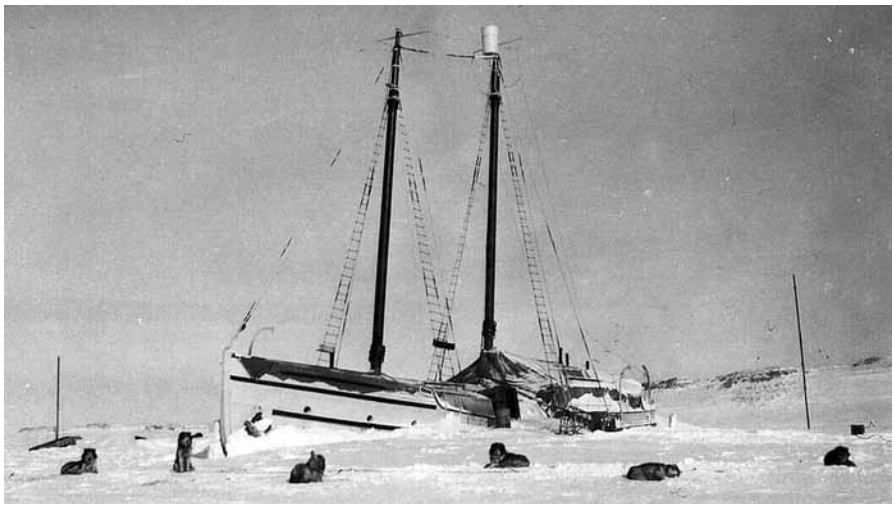


Fig. 10. Antennas on the *St. Roch* in the ice at Tree River. (Source: Parks Canada *St. Roch* photograph collection, HSFR-30-12)

either climb up the rigging or use a bosun's chair to get up high enough to reach the antenna yardarm…the motion of the ship is amplified as you go higher and the view is spectacular."

Finally, the antennas were reconfigured during the 1944 refit and can be seen in Fig. 11.

Prologue

In 1954, the *St. Roch* was sold to the City of Vancouver. The schooner is now a National Historic Site and the main attraction at the Vancouver Maritime Museum.

Wireless and aviation had opened up the Arctic during the operational lifetime of the *St. Roch*. Her mission was accomplished and her Arctic days were over. The two decades after 1954 were the heyday of HF radio communications in the North. Even the smallest community could boast of at least one radio station, and every community was festooned with antennas. This era came to an end early in 1972, when satellite communications came to the North and dishes replaced wire antennas.

Ernie Lyall, who spent 65 years in the North and knew the *St. Roch* well, wrote: "There was no such thing as voice radio early on, so we had to learn the key. We started out with Morse code on the radio to send and receive all our messages.… By 1949 [at Spence Bay] we had radios. There was a two-way radio at the post, but we had an ordinary receiving set in our home too. What I liked listening to

Fig. 11. *St. Roch* antennas after 1944 refit. (Source: City of Vancouver Archives, public domain, AM54-54 LP143)

especially was any news about people in the North–anything about the Mounties in the North, or anything at all to do with the North."[42]

When Henry Larsen was at Cambridge Bay in 1946, he remarked on the changes that were afoot for the community. A major Loran installation was being planned which led to three 633-foot freestanding towers being erected at Barrow, Cambridge Bay, and between the two, at Kittigazuit. Technology passed them by, and finally all that was left was the tower at Cambridge Bay–a landmark and the tallest structure in the territories (see Fig. 12). In August 2014, the tower was taken down as being structurally unsound.

The last surviving member of the *St. Roch* crew was radio operator Dean Hadley (see Fig. 13), who passed away on July 13, 2018. He had been the radio operator on the ship on its epic voyage through the Northwest passages, west to east, in 1941–43. See also the VGSR nameplate (see Fig. 14).

Fig. 12. The 633-foot self-supporting tower at Cambridge Bay. (Author's collection, credit Judith Banning)

Fig. 13. Dean Hadley–last of the crew members. (*Vancouver Sun*)

Fig. 14. Nameplate showing VGSR, callsign of the *St. Roch*. (Source: Vancouver Maritime Museum, 2004.1366.0001)

Postscript

Background on the voyages of the *St. Roch*, as well as a large annotated bibliography may be found at the Vancouver Maritime Museum *St. Roch* Collection at: https://www.vancouvermaritimemuseum.com/sites/default/files/st._roch_research_collection_2015.pdf. Abbreviated bibliographical references are given in the endnotes.

Additional technical information about the radios used aboard the *St. Roch* can be found here: http://jproc.ca/ve3fab/st_roch.html; this document contains links to the bibliography and other documents of potential interest.

The authors have made every effort to acknowledge and credit all sources but some remain unknown. The authors would be pleased to acknowledge and correct omissions or errors.

Endnotes

1. While the term "radio" replaced the term "wireless," the two terms were used interchangeably for many years. This paper adopts the term used in source documents.
2. Guy Lawrence, *40 Years on the Yukon Telegraph*, (Caryall Books, Quesnel, BC) 1990. (Note: for full bibliographic references visit http://jproc.ca/ve3fab/st_roch.html). Herschel Island, home base for the *St. Roch* when in the Western Arctic, is the most northerly part of the Yukon Territory and the most difficult to serve.
3. The history of the development of radio communications in Canada is covered in *Radio Communication in Canada: A Historical and Technological Survey* by Sharon A. Babaian, (National Museum of Science and Technology (Canada), 1992). Bill Miller's *Wires in The Wilderness* (Heritage House, 2004) covers the story of the Yukon telegraph. The history of the NWT&Y radio system is covered at: http://www.nwtandy.rcsigs.ca/history.htm
4. *Stations Radio General: Wireless Telegraph in the North, Part 1*, Library and Archives Canada (LAC) RG12, file 2159.
5. John S. Moir, *History of the Royal Canadian Corps of Signals* (Royal Canadian Corps of Signals, Ottawa, 1962).
6. http://www.nwtandy.rcsigs.ca/1923_29.html
7. The full story of the Herschel Island station can be read at http://www.nwtandy.rcsigs.ca/1923_29.html and on microfilm at the LAC RG85-C-1c, Radio Station, Herschel, YT, microfilm T-13264.
8. Amateur Radio Shoves Off for the Pole, *QST*, Vol. 6, July 1923, p. 10. Complete technical details for the Zenith set appear in this article.
9. LAC RG12, Vol. 163030, *Radio, Government Owned, Northern Radio Stations*.
10. Lewis J. Morrison, *Showing the Flag*, (UBC Press, Vancouver, 1985) p. 30.
11. LAC RG12, Vol. 1112, *RCMP Radio Stations 1924–36*.
12. Solar cycles during the *St. Roch* years are as follows, with cycles running from minimum to minimum: Solar cycle 16 minimum was August 1923, and maximum was April 1928. Solar cycle 17 minimum was September 1933, and maximum was April 1937. Solar cycle 18 minimum was February 1944, and maximum was May 1947.
13. During the IGY, (1957) co-author John Gilbert noted that the high power station at Rugby, England, was audible under the worst of conditions.
14. Marine wireless historian Spud Roscoe confirms that low frequency spark equipment was never used on the *St. Roch*.
15. LAC, Order-in-Council registers.
16. Henry A. Larsen, *The Big Ship*, (McClelland and Stewart, 1967) p. 141.
17. Charles Peter "C. P." Edwards, a naval officer in the Royal Canadian Navy in WWI, became director of the Canadian government radio branch in 1921 and deputy minister of the Department of Transport when it was formed in 1936. A pioneer in telecommunications, he had worked with Marconi. He died in Ottawa in 1960 at age 74.
18. The places visited by the *St. Roch* are remote even today. Further detail on place names and other details can be seen at http://jproc.ca/ve3fab/st_roch_broadcast_frequencies.html
19. Vancouver Maritime Museum (VMM) Series 2.3, Box 12, File 6.
20. This section draws from Tom Clarke's *The Mounties Patrol the Sea* (The Westminster Press, Philadelphia, 1969).
21. Bradley P. Tolppanen, *The RCMP Schooner*

St. Roch and Superintendent Henry A. Larsen, (BC Studies) No. 177, Spring 2013.
22. *Annual Report of the RCMP, 1928*, and Sealey's *Report on Radio-telegraphic Apparatus and Conditions*, LAC RG18-F-1, Vol. 3477, File S-1200-17, 1928–32.
23. LAC RG12, Vol. 1112.
24. Richard Finnie and Terry Parsloe were stranded on the ship for several days during a winter storm.
25. Charlie Harris, VE6HM, handled traffic for co-author John Gilbert 1956–58 while the latter was at Eureka, NU.
26. Moir, *History of the Royal Canadian Corps of Signals*, p. 281.
27. Thomas R. Roach, "The Beaver," *The Saga of Northern Radio*, June 1938.
28. Larsen, *The Big Ship*, p. 113.
29. Comments by Dean Hadley are from his book *What a Life,* (Xlibris Corporation, 2008) and from VMM Series 2.3, Box 10.5.
30. Ibid. This is where the cabin is on the *St. Roch* at the Vancouver Maritime Museum.
31. Doug Gray, *RMS Nascopie: Ship of the North* (Golden Dog Press, 2000).
32. Sgt. F. S. Farrar, *Arctic Assignment* (MacMillan, 1974).
33. J. Lewis Robinson, "Conquest of the Northwest Passage by RCMP Schooner *St. Roch*," *Canadian Geographic Journal*, Feb. 1945 (reprint), p. 23.
34. Ibid.
35. John Beswarick Thompson, *The More Northerly Route* (Ministry of Indian and Northern Affairs, 1974).
36. Sgt. Henry Larsen, FRGS, commander, RCMP, *The North-West Passage 1940–1942 and 1944*, (Royal Geographical Society, 1947) Vol. 110, p. 8.
37. Larsen, *The Big Ship*, p. 196.
38. L. C. Smith, VMM, Series 2.3, Box 9, File 7.
39. LAC RG18, Vol. 3477, letter dated Jan. 25, 1949, from deputy commissioner to controller of radio.
40. The *St. Roch* can be seen today at the Vancouver Maritime Museum. It can also be seen at the website: https://vancouvermaritimemuseum.com/permanent-exhibit/st-roch-national-historic-site
41. LAC RG24, File 5824. A naval service file. Letter from the engineer superintendent, Ship Repairs West Coast, Esquimalt, BC, while the vessel was berthed in the naval yards at Esquimalt.
42. Ernie Lyall, *An Arctic Man* (Goodread Biographies, Edmonton, 1979).

Acknowledgements

This article could not have been written without the support and encouragement of Doreen Riedel Larsen, daughter of Henry Larsen. Tom Brent, Spud Roscoe, Mitch Powell, Diana Trafford and others have provided important information and advice. We are grateful to the staff of the Vancouver Maritime Museum and Library, and Archives Canada, for their help in researching archival documents and artifacts.

About the Authors

Long-time AWA member **John Gilbert** began his career in radio communications as a radio operator. He served in the 1950s at the remote weather stations Eureka and Resolute, Nunavut, and at radio range stations in London and Toronto, Ontario. He worked as an avionics technician while obtaining a degree in political science, graduating from Carleton University in 1969. From 1969, he worked in the Department of Communications, retiring in 1991 as Director-General Government Telecommunications Agency. In 1984 he was seconded for a year to the Independent World Wide Telecommunications Commission. Following 15 years as a private consultant on projects aimed at improving communications in the developing world, he has spent the past decade researching the history of radio communications in remote areas. He is an active radio amateur (VE3CXL) and has written several articles on amateur radio, including a project in 2017 using a WSPR terminal on the Canada C3 vessel the *Polar Prince*, which sailed for 150

days circumnavigating Canada's coasts. He is a member of the Ottawa Vintage Radio Club. John Gilbert is shown in Fig. 15.

Jerry Proc's interest in electronics was sparked at a very young age. During the 1960s he developed a fascination with military radio gear. In 1970, he graduated with a diploma in Electronics Engineering Technology from the Radio College of Canada. Later, he obtained an Advanced Networking Certificate through the Continuing Education Studies program at Humber College, Etobicoke, Ontario. Jerry has served in both a technical and managerial capacity in the mainframe computer and data communications field since 1970, and is retired from Bell Canada, where he held the position of network support specialist. Jerry is known for his restoration of the radio systems aboard HMCS *Haida*, a WWII-era Tribal Class destroyer. During this restoration he became interested in crypto, sparked by 1999–2001 visits to the National Cryptologic Museum at Ft. Mead, Maryland. In October 1999, his restoration efforts were recognized by the Historic Naval Ships Association, which awarded the Bos'n Marvin Curry award to Jerry, who was the first Canadian to receive it. In early 2001, Jerry's research work on radio and radar was officially recognized and incorporated into the Appendices of the new book *HMCS Haida - Battle Ensign Flying* by Barry Gough. His web pages may be viewed at http://jproc.ca. Jerry Proc is shown in Fig. 16.

Fig. 15. Photo of author John Gilbert.

Fig. 16. Photo of author Jerry Proc.