

THE FIRST THIRTY YEARS OF THE CANADIAN MARCONI COMPANY

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This year, 2001, is the 100th anniversary of Guglielmo Marconi's report of reception of a wireless signal in Newfoundland from a transmitter in Poldu, England. This event had, among its many consequences, the establishment of the Marconi Company in Canada. It seems particularly appropriate now to document the development of wireless telegraphy from the perspective of Marconi's Canadian company.

The early years of the Canadian company were documented by D.R.P. (Darby) Coats, among others. Coats was an employee who began his career by training in a wireless operator's school in his native England, and then being assigned as a ship's wireless operator under the direction of the Marconi office in Montreal. Later, in the 1920s he worked as public relations officer for the Canadian Marconi Company (CMC) in Montreal, and later was assigned (or perhaps took it upon himself) to write the history of the company (see box 1). Roger Hart was Manager, Marketing Services with CMC from 1981 to 1996. Some years ago, Roger came across a draft history at CMC, and this was to have been the starting point for a book on CMC history. The book was never published, however, and in 1995 Roger sent a draft of his manuscript to Robert Murray. This article is the product of that draft and subsequent discussions.

1. The Early History

By January 1901, Guglielmo Marconi had succeeded in establishing wireless communication over a distance of 200 miles, a great advance over the 1½ miles that he had first achieved shortly after his arrival in England five years earlier. Despite scientific opinion to the contrary, Marconi was convinced that the curvature of the earth would not prove to be a barrier to the transmission of radio signals over longer distances, and he decided to attempt to establish two-way wireless communication across the Atlantic Ocean. As a result, work was started in 1900 on

Darby Coats was born in Gravesend, some 20 miles south of London. In 1910 Darby went to a school in Stockwell to learn to be a wireless operator. His contemporaries at the school included Harold "Judy" Bride, later assistant wireless operator on the Titanic, and Cyril "Corp" Evans, destined to be wireless operator on the Californian. Upon graduation, Darby was assigned to the Marconi Company office in Montreal from which he was dispatched on ships sailing from that city (Figure 1). Coats moved into the CMC offices in 1919, so he did some announcing in the early days of experimental station XWA. He also had some public relations duties with the firm. In early 1923 Coats had moved to CKY, a government owned broadcast station in Winnipeg, as an announcer and later as public relations director. He appears to have spent most of his career with CKY in Winnipeg, except for his service in the Air Force during WW II, and a brief assignment with the YMCA after the war. While at CKY in the late 1930s and 1940s, he published a listener's newsletter entitled *Manitoba Calling*, which contained first hand accounts of the early days at CMC. It is not clear whether any of his early writing was left at CMC and survived.



Figure 1. D.R.P. Coats as a Marine Wireless Operator in 1915. Source: *Manitoba Calling*, Vol. III, No.10,1939

stations at Poldhu in Cornwall, England, and at Cape Cod in Massachusetts, and testing began in early 1901.

As is often the case, fate, rather than planning, played a large part in the location of the receiving station for the first trans-Atlantic wireless transmission. In September 1901, a severe gale wrecked the massive Poldhu aerial system and at about the same time, another storm wrecked the antenna system at Cape Cod. A simpler antenna system was quickly erected at Poldhu, but Marconi decided not to wait for completion of the reconstruction at Cape Cod, as he feared that rivals such as de Forest and Fessenden might gain the lead. Marconi therefore modified his original objective, and decided to attempt only a one-way transmission across the Atlantic, from the transmitter in Poldhu to a receiving site he was to establish in Newfoundland. On September 17, Marconi and his assistants, Kemp and Paget, duly set sail for Newfoundland.

Marconi's hypothesis about the long-distance transmission of wireless waves was finally proven to be correct when, on December 12th, 1901, at the site near St. John's, Newfoundland, he received the letter "S" in Morse code transmitted from Poldhu.



Figure 2.
*Marconi (centre),
 Kemp and Paget
 on the steps of
 the tower at
 Signal Hill,
 St. Johns,
 Newfoundland,
 on December 12,
 1901.*

*Source: Public
 Archives of
 Canada, Ottawa,
 Canada.*

Spurred on by the success of the Poldhu-to-Newfoundland tests, Marconi decided to set up a permanent sending and receiving station in Newfoundland. Unfortunately, on December 16, 1901, he was informed that his activities constituted an infringement upon Anglo-American Telegraph Company rights in Newfoundland and he was threatened with legal proceedings. He therefore decided to return to England to await the completion of the station on Cape Cod. However, four days later, on December 20, 1901, the Canadian Minister of Finance, W.S. Fielding, wrote to Marconi expressing his pleasure at the suggestion that the experiments might be continued in Nova Scotia. Fielding assured him of a cordial welcome and the co-operation of Government officials and of the absence of difficulties that might get in the way of his operations.

When Marconi arrived at North Sydney in Cape Breton, Nova Scotia, on December 26, he was met by a reception committee that included the Hon. G.H. Murray, Premier of Nova Scotia; Cornelius Shields, General Manager of the Dominion Coal Company; and Alex Johnston, owner and editor of the *Sydney Record* and a local Member of Parliament. As a reporter, Johnston was naturally interested in meeting Marconi, but he was also there for another reason. Johnston realized the tremendous potential of wireless communication and, being aware of the legal difficulties Marconi had encountered in Newfoundland, he intended to persuade the inventor that Cape Breton would be equally suitable for his purpose.

While Marconi was in North Sydney, Johnston managed to convince him that he had a site that was worth serious consideration, and Shields arranged for a special train to take Marconi, Kemp, and Paget to Table Head near Glace Bay. Despite several other offers of land, (including one from Alexander Graham Bell), Marconi quickly decided that the Glace Bay site was the most suitable, and set about raising the capital to build a trans-Atlantic wireless station. In this endeavour he was again greatly helped by Johnston and by A.S. Kendall, another Member of Parliament, who accompanied him to Ottawa to discuss the project with Johnston's personal friend and political colleague, the Hon. W.S. Fielding, Minister of Finance. Through Fielding, the group was able to confer with the Prime Minister, Sir Wilfred Laurier, and the Postmaster General, Sir William Mulock. As a result, an agreement was entered into on March 17, 1902 between Marconi's Wireless Telegraph Company Limited (MWT), the Marconi International Marine Communications Company Limited (MIMCo), and His Majesty, King Edward VII, represented by the Prime Minister, the Rt. Hon. Sir Wilfred Laurier, President of the King's Privy Council for Canada.

By this Agreement, MWT and MIMCo were to erect two wireless stations, one in the United Kingdom and the other in Nova Scotia, with the object of carrying on commercial communications between Canada and the United Kingdom and Europe. The Canadian Government undertook to defray the costs of the erection of the Canadian station up to a limit of approximately Cdn\$80,000. Any excess costs were to be borne by MWT and MIMCo. The companies also agreed that if the undertaking was successful the charge for ordinary messages would be not more than ten cents per word (versus the 25 cents per word then charged for cables), with Government and Press messages to be handled for only five cents per word.

In addition, the Agreement gave the Canadian Government the right to erect stations as it saw fit, using the Marconi system of wireless telegraphy "for communication with any of its lighthouses or life-saving stations on the Coast, or between the Mainland and any island within the jurisdiction of Canada, or with any ships passing to and fro, or in any way to assist in its operations for the protection of life and property on the seacoast or inland waters of Canada, or for the improvement or assistance of navigation." For their part, the companies agreed to furnish all equipment necessary at "fair and reasonable prices free from any charge for patent rights or royalties thereon." In addition, the companies acquired the option, whenever the Government expressed its intention to erect a wireless station, of installing and operating it themselves and retaining for their own use "all tolls collected at such stations for messages transmitted therefrom to passing ships." Marconi and his associates saw

this Agreement with the Canadian Government as the essential ingredient in ensuring the successful and profitable promotion of a new company in Canada. Accordingly, on July 30, 1902, Marconi's Wireless Telegraph Company entered into an agreement with Willard Reed Green of New York, acting both for himself and as agent for a Canadian company he was to form. Within 14 days after the practicability of reception in Canada of the transmission of messages transmitted by the Marconi system from England had been established, Green was to make application for the incorporation of a new company to be called "The Marconi Wireless Telegraph Company of Canada" (MWTC). The company was registered as of November 1, 1902.

The new company was to have a nominal capital of \$4,999,500, in the form of 999,900 shares of \$5 each, and five Directors, three to be nominated by Marconi's Wireless Telegraph Company and two by Green. For its part, MWT agreed to sell to MWTC:

1. all rights existing in Canada and Newfoundland to all inventions in wireless telegraphy and all letters patent thereon which MWT then owned or might at any time thereafter possess;
2. the benefit of all contracts entered into by MWT connected with the use of the Marconi system in Canada and Newfoundland; and
3. all other property, rights, privileges, etc., of MWT in that territory.

In return, the new company was to allot to MWT 660,000 fully paid shares at a par value of \$5 each. One hundred thousand shares were allotted to Green for his services, and he also received an allotment of 40,000 shares to dispose of as he saw fit to "defray the costs of advertising and his expenses in selling shares." The remaining 200,000 shares were allocated to provide working capital for MWTC. Green had the sole privilege of selling up to 440,000 shares at any time up to three months after the incorporation of MWTC, 100,000 of which were to be provided by Marconi's Wireless Telegraph Company, 200,000 by MWTC, and 140,000 by himself. The only restriction placed upon Green was that the shares should not be sold at less than \$2.50; it appears that any amounts received in excess of that price would belong to him.

The first test transmission from Glace Bay was made on November 19, 1902, but reception at Poldhu was poor. Several modifications to the equipment and antennas were made over the next two weeks, and on December 5 the receiving station at Poldhu reported the first readable signals from West to East. Reception continued to be sporadic, however, and it was not until December 21 that Marconi sent a formal message to England from the new station, saying that he had established trans-Atlantic

wireless telegraphic communication “with complete success.” On January 3rd, 1903, the first CMC Directors’ meeting was held, attended by J.N. Greenshields, W. Barwick, H.C. Osborne, J. Payne, and Willard R. Green, who became the first president of the Company. At the meeting, By-Law 23 was passed, authorizing the stock issue and arrangements with MWT. This agreement was to govern the relationship between the two companies for nearly 50 years. It re-stated the relationship between the Canadian assets of MWT that were to be transferred to CMC, in accordance with the original agreement with Willard Green, and then went on to make further provisions, including:

1. Marconi’s International Marine Company (MIMCo), which by an agreement with MWT dated April 30, 1902, had acquired all rights to the Marconi system in the marine field, assigned to CMC all its rights in Canada and Newfoundland.
2. MWT and MIMCo transferred to CMC the benefit of the contract of March 17, 1902 with the Canadian Government concerning the establishment of a station at Table Head.
3. All gross tolls from communications between the United Kingdom and Canada were to be divided equally between MWT and CMC.
4. All tolls for communications between any vessels at sea and any shore stations, or between two or more vessels at sea, were to accrue to the benefit of the company owning the rights for the country to which the vessel or shore station dispatching the message belonged.
5. If a Canadian ship were fitted in the U.K. by MIMCo with the Marconi system, half the net profit from the manufacture and installation of the equipment was to be paid to CMC. There was a similar arrangement regarding U.K. ships fitted by CMC.
6. If CMC acquired any invention in the field of wireless telegraphy, it would assign all rights thereunder, other than the Canadian ones, to MWT.

It should be noted that this agreement implies that the principal, and perhaps only, sources of revenue contemplated for CMC were trans-Atlantic and marine communications; there is no evidence that anyone at that time envisaged any other use for wireless telegraphy. It is also worth noting that the physical assets transferred by MWT to CMC under the 1903 agreement were nominally valued at \$100,000, so that the payment to MWT for patents and other rights amounted to \$3,200,000 in the form of stock and seem, therefore, to have been regarded as the principal asset of the new company. However, although these were a wasting asset, no action was taken to write them down on the books until 1919.

Over the next few days, Mssrs. Payne, Osborne, Barwick and Greenshields resigned, and were replaced by Mssrs. J.D.Oppe, A. Allen, R. Forget, and Col. F.C. Henshaw. In addition, J.D. Oppe was appointed General Manager. At a General Meeting of Shareholders on January 10, 1903, 900,000 shares were represented, as follows: 560,000 MWT, England; 339,920 W.R. Green; and the balance by the Directors. At the meeting, Guglielmo Marconi was appointed Vice-President, and his salary established at \$2,500 per annum. Two days later, the Company's offices were established at 1724 Notre Dame Street East in Montreal.

For a number of years, MWT had been in a dominant position in wireless telegraphy and hoped to establish a world-wide monopoly. Marconi's first patent had been issued in 1896 and he had obtained a number of others during the next three or four years. All of these now seem very primitive indeed, for in none of them is there any evidence that Marconi was aware of the principle of resonance, which is fundamental to the whole radio art. In fact it was not until the publication of his famous patent number 7777 in April 1900 that the use of this principle was disclosed. This patent, however, greatly strengthened Marconi's position and must have encouraged him and his associates in their ambitions for world monopoly. They had set up the American Marconi Company in 1899 and other subsidiaries in Belgium, France, Russia, Spain, and several other countries before 1910. They had acquired by contract with Lloyd's the right to set up wireless stations, for communications with ships, in any of the signal stations of Lloyd's world-wide network and pursued a vigorous policy of constructing coastal stations, at the same time that they were equipping ships. During the early years they discouraged competition, particularly from Germany, by forbidding their coast stations to communicate with ships not equipped with Marconi equipment. The first real obstacle in this march towards monopoly occurred in 1906 when the Berlin Convention was ratified, requiring free interchange of wireless messages irrespective of the systems employed.

By a special act of Parliament, The Marconi Wireless Telegraph Company of Canada, Limited was granted a Dominion Charter on August 13, 1903, without any change in name. The books were closed for the first time as at January 31st, 1904, showing a deficit of \$33,125. This represented expenses incurred at Montreal and Glace Bay, as no revenue was earned during that period. Annual financial results from this time forward until 1947 are shown below in Table 1.

2. The Beginning of the Commercial Era

On May 13th, 1904, the first contract for construction and operation of coast stations was entered into with the Canadian Government. This

Table 1. Canadian Marconi Company - Financial Statements

Cal Year	Fisc Yr End	Net Profit (Loss)	"Net Worth"	Capital Stock			
				No. Auth	Par Value	Total Value Auth	Issued
1903	Jan 31 1904	(\$33,125.26)	\$5,030,292.87	5000000	\$1.00	\$5,000,000	\$5,000,000
1904	Jan 31 1905	(\$36,199.26)	\$5,137,256.63	5000000	\$1.00	\$5,000,000	\$5,000,000
1905	Jan 31 1906	(\$3,195.69)	\$5,274,122.70	5000000	\$1.00	\$5,000,000	\$5,000,000
1906	Jan 31 1907	(\$55,583.23)	\$5,398,260.76	5000000	\$1.00	\$5,000,000	\$5,000,000
1907	Jan 31 1908	(\$117,023.86)	\$5,536,968.05	5000000	\$1.00	\$5,000,000	\$5,000,000
1908	Jan 31 1909	(\$73,968.75)	\$5,622,824.48	5000000	\$1.00	\$5,000,000	\$5,000,000
1909	Jan 31 1910	(\$42,833.38)	\$5,733,183.60	5000000	\$1.00	\$5,000,000	\$5,000,000
1910	Jan 31 1911	(\$45,076.61)	\$5,838,272.94	5000000	\$1.00	\$5,000,000	\$5,000,000
1911	Jan 31 1912	(\$5,467.33)	\$5,441,681.00	5000000	\$1.00	\$5,000,000	\$5,000,000
1912	Jan 31 1913	\$62.11	\$5,573,959.50	5000000	\$1.00	\$5,000,000	\$5,000,000
1913	Jan 31 1914	\$7,158.62	\$5,707,753.95	5000000	\$1.00	\$5,000,000	\$5,000,000
1914	Jan 31 1915	\$50,020.11	\$5,743,866.63	5000000	\$1.00	\$5,000,000	\$5,000,000
1915	Jan 31 1916	\$110,226.06	\$5,808,083.63	5000000	\$1.00	\$5,000,000	\$5,000,000
1916	Jan 31 1917	\$104,929.45	?	5000000	\$1.00	\$5,000,000	\$5,000,000
1917	Dec 31 1917	\$114,953.09	\$5,947,019.92	5000000	\$1.00	\$5,000,000	\$5,000,000
1918	Dec 31 1918	\$138,647.98	\$6,024,336.94	5000000	\$1.00	\$5,000,000	\$5,000,000
1919	Dec 31 1919	\$102,130.84	\$3,817,621.17	1500000	\$2.50	\$3,750,000	\$2,500,000
1920	Dec 31 1920	\$69,906.38	\$6,394,727.36	3000000	\$2.50	\$7,500,000	\$5,500,000
1921	Dec 31 1921	\$12,253.31	\$6,424,737.64	3000000	\$2.50	\$7,500,000	\$5,525,000
1922	Dec 31 1922	\$22,251.36	\$6,841,044.31	3000000	\$2.50	\$7,500,000	\$6,000,000
1923	Dec 31 1923	(\$39,144.73)	\$7,112,959.59	3000000	\$2.50	\$7,500,000	\$6,300,000
1924	Dec 31 1924	(\$42,510.70)	\$3,579,939.51	7500000	\$1.00	\$7,500,000	\$2,520,000
1925	Dec 31 1925	\$37,984.20	\$4,224,876.23	7500000	\$1.00	\$7,500,000	\$3,380,642
1926	Dec 31 1926	\$24,362.71	\$4,338,089.59	7500000	\$1.00	\$7,500,000	\$3,380,642
1927	Dec 31 1927	\$46,555.55	\$4,888,692.34	7500000	\$1.00	\$7,500,000	\$4,504,682
1928	Dec 31 1928	\$181,590.97	\$5,062,135.76	7500000	\$1.00	\$7,500,000	\$4,554,682
1929	Dec 31 1929	\$162,806.53	\$5,212,987.28	7500000	\$1.00	\$7,500,000	\$4,554,682
1930	Dec 31 1930	\$13,441.00	\$5,281,582.52	7500000	\$1.00	\$7,500,000	\$4,554,682
1931	Dec 31 1931	(\$98,651.29)	\$5,148,492.24	7500000	\$1.00	\$7,500,000	\$4,554,682
1932	Dec 31 1932	(\$188,085.96)	\$5,083,972.80	7500000	\$1.00	\$7,500,000	\$4,554,682
1933	Dec 31 1933	(\$173,523.98)	\$4,955,957.14	7500000	\$1.00	\$7,500,000	\$4,554,682
1934	Dec 31 1934	\$60,386.78	\$4,794,809.69	7500000	\$1.00	\$7,500,000	\$4,554,682
1935	Dec 31 1935	\$96,159.98	\$4,830,929.76	7500000	\$1.00	\$7,500,000	\$4,554,682
1936	Dec 31 1936	\$189,316.15	\$5,004,606.21	7500000	\$1.00	\$7,500,000	\$4,554,682
1937	Dec 31 1937	\$268,376.96	\$5,379,282.56	7500000	\$1.00	\$7,500,000	\$4,554,682
1938	Dec 31 1938	\$335,914.92	\$5,508,104.49	7500000	\$1.00	\$7,500,000	\$4,554,682
1939	Dec 31 1939	\$278,030.17	\$5,815,337.24	7500000	\$1.00	\$7,500,000	\$4,554,682
1940	Dec 31 1940	\$493,763.06	\$6,229,730.70	7500000	\$1.00	\$7,500,000	\$4,554,682
1941	Dec 31 1941	\$572,209.40	\$7,602,464.37	7500000	\$1.00	\$7,500,000	\$4,554,682
1942	Dec 31 1942	\$329,959.35	\$10,964,593.04	7500000	\$1.00	\$7,500,000	\$4,554,682
1943	Dec 31 1943	\$180,639.02	\$12,276,602.58	7500000	\$1.00	\$7,500,000	\$4,554,682
1944	Dec 31 1944	\$198,709.66	\$10,938,781.54	7500000	\$1.00	\$7,500,000	\$4,554,682
1945	Dec 31 1945	\$197,605.26	\$8,389,846.99	7500000	\$1.00	\$7,500,000	\$4,554,682
1946	Dec 31 1946	(\$25,947.41)	\$8,459,697.10	7500000	\$1.00	\$7,500,000	\$4,554,682
1947	Dec 31 1947	\$67,872.12	\$9,105,812.73	7500000	\$1.00	\$7,500,000	\$4,554,682

from Marconi Wireless Telegraph Company of Canada Annual Reports

called for stations to be erected at Belle Isle, Point Amour, Heath Point, Fame Point, and Cape Race, these stations to be owned by the Canadian Government but operated and maintained by CMC. In addition, CMC agreed to erect, at its own expense, a station on Sable Island and one on the mainland; on August 12, Cape Ray was added to the Government stations.

In an attempt to produce more consistent reception, the power of the Glace Bay station was increased to 150-kilowatts and the wavelength was changed to 3660 meters. In addition, 24 lattice towers were erected, (at a cost of over \$62,000) to support a “square cone” of 400 copper wires, so constructed that all or part of the complete system could be utilized at any one time (Figures 3, 4 and 5). Great difficulties were still experienced, however, in establishing a reliable trans-Atlantic radio service, and it was soon realized that mere increases in power and antenna size would not overcome these problems. Attempts to establish the service were therefore curtailed until the technology was equal to the task. A new site for the Glace Bay station was purchased for \$7,386 at Port Morien, six miles from the original site at Table Head, as the latter could not accommodate the larger antenna system required for trans-Atlantic communication. This new site (still referred to as Glace Bay) had an area of over 600 acres, or approximately one square mile, allowing the construction of an antenna consisting of 200 wires stretched out in an umbrella shape and anchored to supports forming a circle with a diameter of almost half a mile. By 1906, the station had cost some \$150,000; since revenues for the year were a mere \$150, these funds were borrowed from MWT in England.



Figure 3.
*Erecting
lattice
towers at
Glace Bay.*



Figure 4. *Glace Bay tower construction.*



Figure 5. *Marconi Wireless Station, Glace Bay, before the move to Port Morien.*

During 1905, additional coast stations were constructed, operated and maintained on behalf of the Canadian Government. Stations were built by the Company at Sable Island and Halifax at a total cost of approximately \$15,500. There was also a temporary (summer) station at Whittle Rocks on the north coast of the St Lawrence River, which formed part of a chain to Flame Point. Ships tolls revenues for the year were some \$1,403.55.

During the period 1906-1908, the history of the Company is one of continual improvement of the facilities at Glace Bay and the construction of additional stations on the East Coast on behalf of the Canadian Government. An increasing number of vessels were being fitted with the Marconi system at this time, many of which were in communication with the stations that had been established on the East Coast. Ships tolls revenues for 1906 were \$7,339.82.

The Marconi Company in Canada, 1906

When I arrived at the station in Glace Bay I was told that the manager, Mr. Vyvyan, had not yet arrived and I was advised to proceed down the drive to his residence. About half way I met a young man in tennis flannels and asked him if I was going in the right direction to see Mr. Vyvyan. He told me that Mr. Vyvyan was on his way to the station and I would meet him on his way. I also asked if there was any likelihood of a vacancy at the station. He was most polite and helpful and then went on his way. In about fifteen minutes I met Mr. Vyvyan and told him the reason for my visit. Mr Vyvyan surprised me by saying, "I see you have already met our Mr. Marconi." I was really staggered to hear this and on giving Mr. Vyvyan a brief outline of my studies and working life to date he promised to send me notice as soon as he had a suitable vacancy. Several months later I received a message requiring me to report at the station. This I did and was employed to assist Mr. A. Warren in the machine shop. This was a few weeks before the news was received at the station of the death of Edward VII in England.

From unpublished recollections of William Appleton, MBE, former CMC employee.

In 1907, a new station was built by MWT at Clifden in Ireland, operating on a wavelength of 6,666 meters, and by February, 1908 an unlimited service between Clifden and Glace Bay had been established (Figure 6). At year's end, the Company owned stations at Cape Sable, North Sydney, Pictou, Three Rivers, Sable Island, and Halifax, in addition to the Glace Bay station. For the first time, Glace Bay is shown as making a contribution to the income side of the ledger, with revenues for the year of \$2,012 for trans-Atlantic traffic and \$433 from manufacturing. In 1908, these revenues rose to a total of \$7,875, including \$5,846 for trans-Atlantic tolls and \$1,700 for ship tolls.

In 1909, CMC opened its first Montreal workshop, on Delorimier Street, for the manufacture of apparatus used on low-power stations and

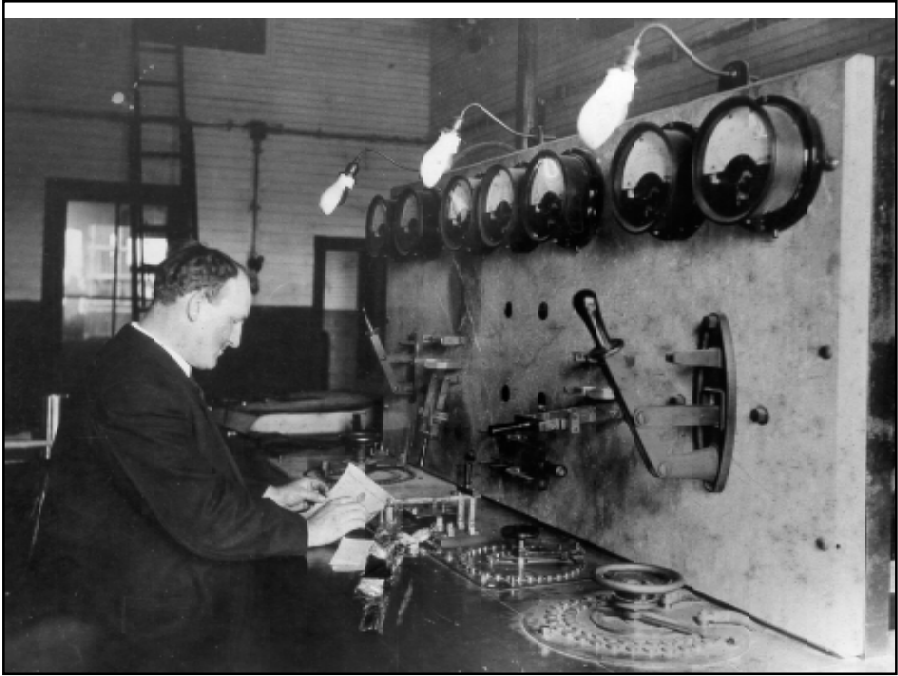


Figure 6. *Glace Bay, October 1907, L.R. Johnston is the operator.*

as a repair depot (Figure 7). In August, the operating house at Glace Bay was destroyed by fire, necessitating the cancellation of the trans-Atlantic service until April 23, 1910. However, this disaster gave the Company an opportunity to re-design the station building and to introduce modern equipment for long-distance wireless telegraphy, including the replacement of the alternating current supply with a direct current supply derived from a massive storage battery and a huge air condenser.

By the end of the year, CMC was operating 26 coast stations, 15 of which were owned by the Canadian Government, five by the Newfoundland Government, and the remaining six by the Company. On all Government-owned stations, CMC received a yearly subsidy and also retained the traffic tolls, which amounted to \$36,100 for the year ended January 31, 1910.

By the end of 1910, 29 stations in Canada and Newfoundland were owned or controlled by CMC, including the one at Camperdown, Nova Scotia, pictured here (Figure 8). At year end, the Marconi system had been installed on 536 vessels, of which 223 were large passenger steamers regularly plying the North Atlantic route and communicating with stations controlled by the Company “for up to three days before arriving at and after leaving port.” Traffic receipts for fiscal 1910 amounted to \$42,630.



Figure 7. CMC first factory on Delorimier Street in Montreal.

One morning I was awakened by the sound of falling buildings and I saw that the transmitting house was fiercely ablaze. All hands including the staff were quickly on the spot but the water supply and extinguishers were unable to cope. In the spark room were several tanks containing hundreds of gallons of insulating oil, in addition to oil filled transformers. All that was left of the station was the power house and machine shop, which were about 200 yards from the fire. Practically nothing was salvaged.

After this there was nothing to be done except get busy with ordering new machines and making new transmitting apparatus. The engineering staff together with Warren and myself were kept busy almost 20 hours a day seven days a week for several months. I often managed to get a couple of hours sleep upon a 20" wide engine belt in the power house. A new system of producing high frequency energy was adopted which included 6,600 large accumulators in series which were charged from a group of 5,000 volt DC generators at 15-amps initial rate.

It was on one Good Friday that forty labourers plus all the staff including Mr. Marconi himself were assembled early to begin the filling of the cells. Every available acid proof utensil was commandeered and work commenced. About 20,000 gallons of acid were used up and many were spilled over our clothing and shoes by the end of the day. Most of the clothing had to be scrapped. During these operations, all suffered intensely from the irritation caused by the acid and the fumes. The language of most would have caused another fire but Mr. Marconi was able and did express his feelings in his native Italian. From unpublished recollections of William Appleton, MBE, former CMC employee.

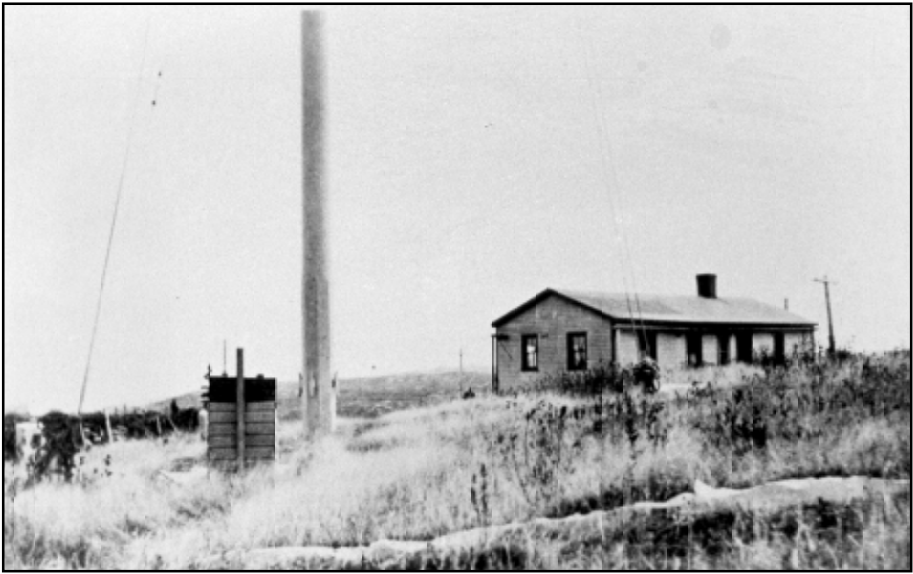


Figure 8. *Camperdown, Nova Scotia, Marconi Wireless Station.*

The development of the Marconi System through the Great Lakes was started in 1910 with the establishment of a station at Port Arthur, Ontario, and the equipping of three vessels.

On February 21, 1911 a sweeping decision entirely in favour of MWT was given in the High Court of Justice, London, England. In the case of MWT versus the British Radio Telegraph and Telephone Company Limited, the latter were adjudged infringers upon the Marconi's famous patent 7777, which covered the principle of resonance, essential to the efficient operation of any wireless telegraph station. This decision was very important, as it greatly strengthened the position of the Marconi companies throughout the world and enabled them to retain a virtual monopoly on wireless telegraphy.

Another important event in 1911 was the signing of an agreement, dated April 5th, between the Company and the Canadian Government, which superseded and replaced all previous agreements and contracts and established the basis of operation for all Coast Stations operated by CMC. This agreement provided that CMC would be paid specified fixed subsidies, and in addition, would be entitled to retain all Coastal Station traffic tolls. The contract also provided that, in consideration of the payment which had been made by the Government under the 1902 agreement with MWT, CMC would not charge more than ten cents per word for commercial traffic and five cents per word for Press traffic handled through the Glace Bay station. In addition, no charge was to be made to the Government for messages handled through any of the Coast Stations operated by CMC. The contract was to remain in force for 20 years and provided for payment

of full subsidies for the first 10 years and for a reduction in subsidies at the rate of 10% per annum over the second 10 years.

By the end of 1911, the Company was involved in the operation of some 33 shore stations. It was in 1911 that the plan to erect a chain of long-distance wireless telegraph stations “to girdle the earth” was first announced. Under a contract between the British Government and Marconi’s Wireless Telegraph Company, the latter was to receive \$300,000 for each station, exclusive of sites, foundations, and buildings, plus 10% of the gross receipts for all stations for a term of 28 years. As it turned out, however, it was to be a considerable period of time before the plan was actually realized. Also in 1911, the Marconi Wireless Telegraph Company of America absorbed the United Wireless Telegraph Company, which had been a fierce competitor in certain areas. A number of steamers of Canadian register, formerly operated by United, consequently came under the control of the Company.

Over the previous few years, the trans-Atlantic business of the Company had been subject to very strong competition from the land telegraph companies of Canada and the US, all of which were affiliated with various cable companies. An agreement with the Western Union and Great North Western Telegraph companies, signed in 1911, provided for their handling trans-Atlantic Marconigrams, and for the acceptance and delivery by the telegraph companies lines, offices, and messengers on the same terms as those enjoyed by the cable companies. This agreement, together with an anticipated increase in capacity, was expected to greatly augment revenues from trans-Atlantic traffic.

Early in 1911, the Company, to some extent as a result of Government urging, announced its intention to establish a chain of stations along the Great Lakes to link the existing stations at Montreal and Port Arthur. A draft agreement was prepared, under which the Company was to equip and operate four stations, receiving from the Government the sum of \$3,500 per year per station, in addition to retaining 85% of the traffic receipts. A further five stations were identified as being required to complete the chain, and these were to be operated under the same terms after they were completed. On September 7th, 1912, the agreement was signed under which the Company agreed to maintain and operate eight stations on the Great Lakes on behalf of the Canadian Government, including those at Midland and Point Edward shown here in Figures 9 and 10.

At the end of the year, the Company had contracts for the installation of Marconi apparatus on a total of 44 vessels, including 12 Great Lakes vessels, ten steamers on the Atlantic coast, 11 on the Pacific coast under Company control, three trans-Pacific steamers controlled on behalf of the Marconi International Marine Co., and a further four operated on

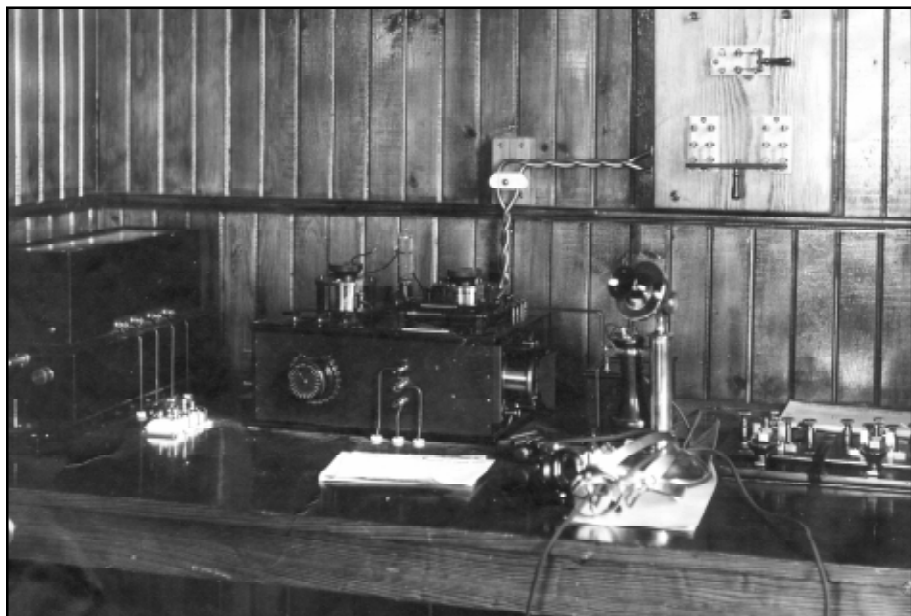


Figure 9. *Operating room, Marconi Station at Port Edward, Ontario.*

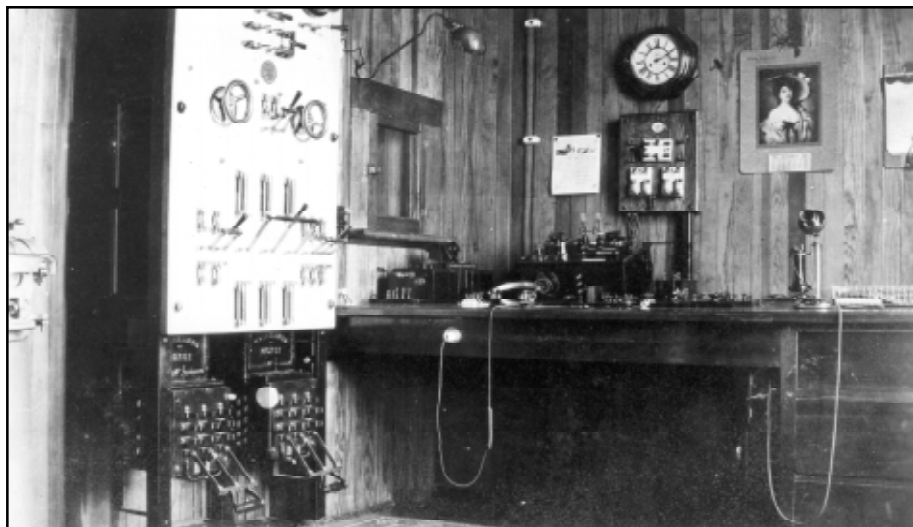


Figure 10. *Marconi Station at Midland, Ontario, showing switchboard in foreground.*

behalf of affiliated companies. A standard contract at that time was for a period of five years. A small CMC marine set of the time is shown in Figures 11 and 12.

Traffic receipts for ship-to-shore and inter-station business continued to increase, and the total for the year amounted to \$52,322. The capacity of the Glace Bay station was increased, and it was decided to erect a duplex receiving station at that location. The total receipts for the year for trans-Atlantic traffic amounted to \$44,950.



Figure11. *1/4-kW
marine set, front
view.*

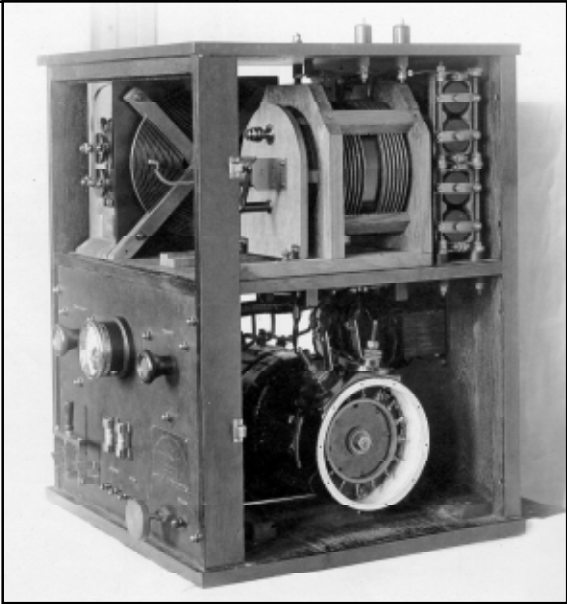


Figure 12. *1/4-kW
marine set, side view.*

The contract providing for the erection of a chain of long-distance wireless telegraph stations to girdle the earth was ratified in 1913, sites were selected, and construction began. Then came World War I, with strict Government control of all communications, and work on the project was suspended.

Early on Sunday morning, April 14th, 1912, normal communication was established by the CMC station at Cape Race with the *S.S. Titanic*, which was then 800 miles to the east. All was normal until 12:25 a.m. on April 15th, when a distress signal was received from the *Titanic* indicating that she had struck an iceberg and was in serious danger. Messages were immediately sent from Cape Race to other ships within range, several of which indicated that they were altering course and proceeding to the scene. The station also telegraphed the ship's owners at New York, Liverpool, and Southampton and within half an hour telegrams began pouring in from many distant points requesting more information. Indeed, Cape Race was the only Coast Station that handled ship-to-shore

communications in the early stages of the disaster. This disaster brought to the attention of the world the great advantage of wireless communication and provided a marked impetus for its development over the next few years.

The CMC annual report for the period ended January 31, 1914 states that the business done under contract with the Canadian and



Figure 13. *Condenser house, Glace Bay, May, 1912.*



Figure 14. *Operating table, Glace Bay.*

Newfoundland Governments had expanded “satisfactorily,” but that ship traffic receipts had been seriously interfered with by the destruction of the operating house at the Cape Ray Station by fire on May 5. Despite the establishment of a temporary station within two days of the fire, it was not until September 30 that a full commercial service was resumed. Inside views of the Glace Bay station of the period are shown in Figures 13 and 14.

Until 1913, both Glace Bay and Clifden trans-Atlantic stations had operated on a simplex basis, that is, neither station could send and receive at the same time. In the latter part of that year, duplex systems allowing simultaneous reception and transmission were instituted, but the proximity of the receiving and transmitting stations caused insurmountable problems due to interference. This was a serious drawback, as introduction of the



Figure 15. *Marconi Receiving Station at Louisbourg, Nova Scotia.*

duplex system would have doubled the capacity of each station, and thus allowed much greater revenues. By early 1914, both Clifden and Glace Bay had solved this problem by the simple expedient of moving their receiver sites 25 miles from the transmitting stations, the Clifden receiver station being located in Letterfrack, and the Glace Bay receiver station at Louisbourg (Figure 15). The extra space also permitted the installation of directive aerials that gave optimum reception in the direction of the distant station and reduced interference from the local station to a minimum.

In November 1913, a great blizzard occurred and the eight coastal stations then established on the Great Lakes, including the Sarnia station that had been opened in February of that year, played a major role in providing assistance to navigation. In recognition of the efforts of the CMC employees on these stations, several of the Officers-in-Charge received medals from United States ship owners.

Under a contract with the Department of Railways awarded in 1912, communication was established in 1913 between two new high-power stations at La Pas, Manitoba, and Hudson's Bay. However, completion of these stations was delayed due to lack of transportation facilities, and they were not finished until the following year. Figure 16 shows a station building at Port Nelson, Hudson's Bay, and Figure 17 a more

detailed view of one of the 350 ft. steel towers. Figure 18 shows the receiving room.



As a result of the aftermath of the *Titanic* disaster in 1912, the Maritime nations of the world passed regulations requiring all ships of certain classes to carry wireless equipment. This led to a period of expansion, and by 1913 MIMCo had secured or was negotiating for concessions in more than 20 foreign countries. In addition, Government statistics for 1912 show that fully 90 of a total of 93 vessels of Canadian registry were equipped with the Marconi system.

Figure 16. *Marconi Station, Port Nelson, Hudson's Bay.*

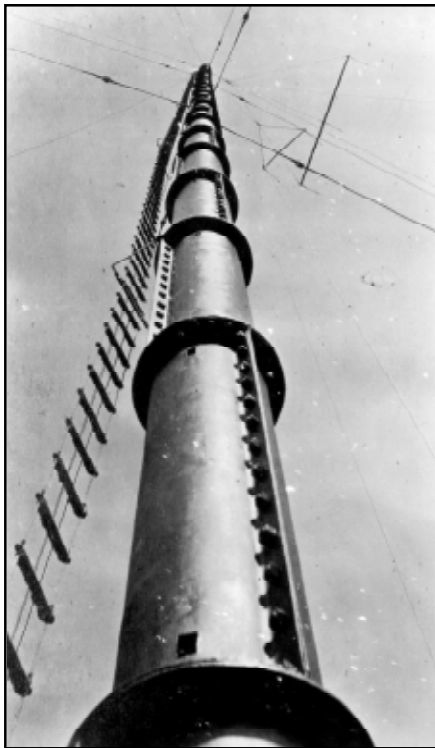


Figure 17. *One of the 350' steel aerial masts at Port Nelson.*

World War I brought all normal commercial wireless development to a halt, but it also greatly stimulated the development of the vacuum tube, whose use and further development after the war was to transform the world of wireless into the world of radio. It seems, however, from the events that occurred shortly after the war, that the minds of the leading men in the wireless business were still pre-occupied with its principal function of trans-oceanic and maritime communications.

The war also created a demand for new ships, and large numbers of vessels were constructed in Canada for both the British and Canadian Governments.

Government regulations required all these vessels to be equipped with wireless apparatus, with the result that the Company had to substantially increase production in order to meet the higher demand.

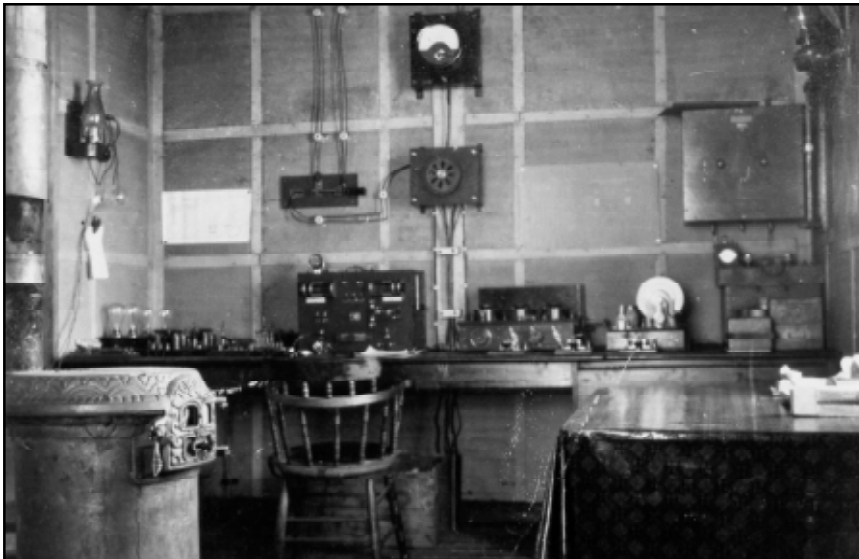


Figure 18. *Receiving Room, Port Nelson.*

There was a net profit of \$50,020 for 1914. In addition, claims were submitted to the naval authorities to compensate for the loss of revenues from the coastal stations. Branch offices and stores were opened in Toronto and Vancouver, and a well-equipped, three-story factory with excellent shipping facilities was established in Montreal on Rodney Street (Figures 19 and 20). The office facilities were moved at about the same time to Room 507 of the Shaughnessy Building at 137 McGill Street.



Figure 19. *Works Department, Rodney St., Montreal, 1914, showing a Tuner type 843 at the left side in the foreground*



Figure 20. *Marconi staff, Rodney St. Works, early 1915.*

Coastal stations at Port Burwell, Toronto, and Kingston were formally commissioned in February, 1914. The Kingston station was fairly typical of these, having a “standard” 5.5-kilowatt disc transmitter built by CMC, an earthing network of some 2000 feet of copper netting, and three-section antenna masts 185 feet high. The system had a nominal wavelength of 600 meters, but transmissions varied from 600 to 1600 meters, and reception from 300 to 3000 meters. Receiving equipment included both a Marconi “Maggie” magnetic detector and a carborundum crystal detector (Figures 21, 22 and 23). At the Cape Race station, the 160-ft. wooden spar masts were replaced with 250-ft. steel ones, greatly increasing the range of the station.

During the war years, traffic to and from ships was adversely affected by the severe censorship which was imposed, the general dislocation of passenger traffic, and the placing of important stations at the disposal of the Government. There were, however, important gains in the volume of trans-Atlantic traffic, and the over-all result of operations for these years showed considerable improvement with profits being earned each year from 1914 to 1918 inclusive.

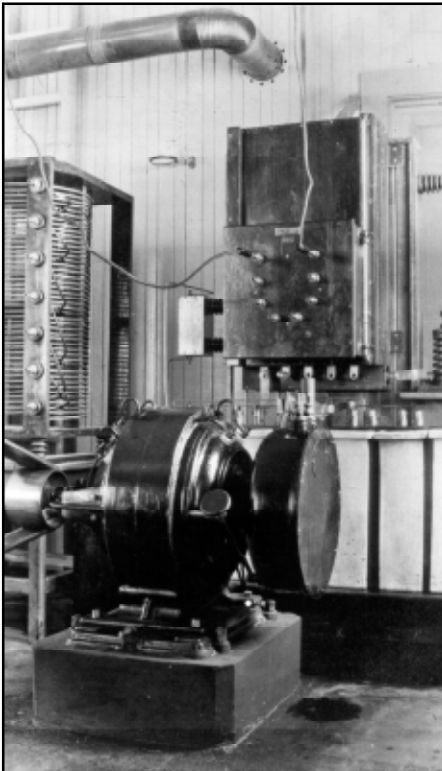


Figure 21. *Transmitting Room, Marconi Station, Kingston, Ontario.*



Figure 22. *Operating Table, Marconi Station, Kingston.*

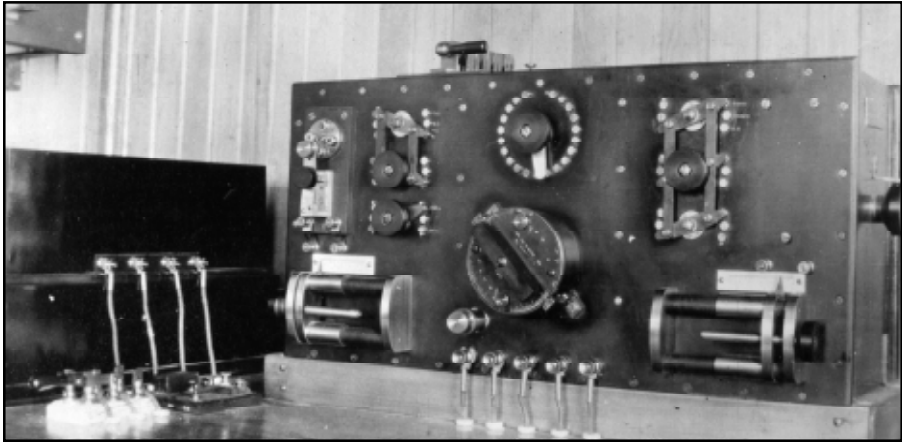


Figure 23. *Close-up of Tuner type 843, Marconi Station, Kingston.*

In 1915, a school of instruction for operators was established in Montreal under the direct control of the Company, and equipped with the latest apparatus (Figure 24). In this year a Marine Depot was also established in St. John's, Newfoundland.

In 1917, there was an increase in the number of vessels of the Canadian Mercantile Marine equipped with Marconi apparatus. This increased the revenues from rental contracts and also from ship tolls. During this



Figure 24. *Darby Coats instructing at the school for operators in Montreal.*

year, also, the Company purchased the building that it partially occupied at 173 William Street, Montreal, and equipped it with modern apparatus (Figure 25). Later, the factory on Rodney Street was closed and all operations were transferred to the William Street premises.

On August 4th, 1917, the Company's trans-Atlantic stations at Glace Bay and Louisbourg were closed to public service by order of the British Admiralty. Claims were rendered against the British Government for loss of revenue incurred by this suspension of service. In the same year, a basis of settlement for the two-year period ending 31 July, 1917, was arrived at with the Canadian Government in compensation for the closing down of certain East Coast stations. Following the signing of the armistice in 1918, these restrictions were gradually lifted and, as of December 2, 1918, the stations were allowed to re-open and handle Press and Government traffic; authority from the Admiralty to accept commercial messages, however, was not received until March 10, 1919.

During 1917, 122 vessels were fitted, despite difficulty in obtaining some parts (notably motor-generators which had previously been imported and which the Company then decided to manufacture itself).



Figure 25. *William St. Factory. Experimental broadcast station XWA was later installed in the top left corner.*

I first became interested in radio only after I had been given a job by Marconi's Wireless Telegraph Company of Canada Limited, which began on January 13, 1919. It has to be appreciated that at that time there was no radio broadcasting, and hence amateur work was limited to a relatively small group who were concerned with radio-telegraphy. However, very soon after I joined the company, broadcasting commenced and my interest, and that of most other technically minded people began at that stage; confined of course to the various forms of crystal receiving sets at the beginning.

I joined the company as an engineering apprentice for a 5 year term. The idea being that during that term the apprentice would be trained in very nearly all, if not all, of the technical sides of the business. I started in the shop and spent the better part of two years there. During that time we were given courses in radio telegraph operating, in rigging of masts and aerials, splicing of ropes and a number of other things of that kind. Later we were introduced to test work now called quality control, and of course there was a very great deal of installation work to be done on ships and on coast stations. I applied to the company for a leave of absence to attend university beginning in the Fall of 1920. The university program and the apprenticeship worked very well together, and thus I spent four Winters at the university and was more or less guaranteed a summer job. I know of no other apprentices in this company who at the same time studied engineering at the university.

I might say that at the very beginning the rate for an apprentice was \$30.00 a month with no fringe benefits except a two week vacation and a 60 hour week. Later this was changed to a 55 hour week, and we felt a very great sense of progress indeed having Saturday afternoon off.

Unpublished recollections of S.M. Finlayson, CMC President from 1951 to 1964.

3. The Broadcasting Era

CMC's earliest experiments with radio-telephony were conducted by Mr. Arthur Runciman in 1919. A 500-volt battery was set up on a truck and a "Captain Round" type transmitter tube (Tyne, 1977, Chapter 11) was connected to an antenna on the roof. Tests indicated a range of 3 or 4 miles, but in later experiments, with the transmitter set up on Tarte Pier, wireless operator Harris aboard the ice-breaker "Lady Grey" 30 miles down river from Montreal reported very good reception.

These tests were preliminary to the installation of a 500-Watt transmitter imported from the MWT factory in the United Kingdom, and designed to permit continuous-wave wireless telegraphy, buzzer-modulated wireless telegraphy, or radio-telegraphy (Figure 26). Using this equipment, Canadian Marconi initiated broadcasting of the human voice and music in Canada. Test programs were carried out by the Company from its premises on William Street in Montreal on a wave length of 1200 meters, using the call sign XWA. The first programs were quite amateur affairs, consisting of gramophone records, news items, and weather reports, with the announcing done by CMC employees. There was no schedule at this time, and no

proper studio. In fact, the very first broadcasts were made from a laboratory. It is difficult to say just how large the audiences were for these transmissions, though they certainly grew rapidly as the new 'fad' of radio caught on. Certainly the first listeners were radio amateurs rather than the general public, for the latter had not yet been seized by the new medium and had no idea of how to operate the complicated apparatus.

Much has been written about which station should receive credit for being the one to initiate broadcasting in North America, with KDKA in Pittsburgh usually being given the distinction by American sources and XWA being quoted by Canadian historians. The matter is unlikely to be solved definitively, however, since it hinges on a definition of what could be considered "broadcasting" at that time. Both the Canadian, Reginald Fessenden (in 1906), and the American, Lee de Forest made "broadcasts" that far predated any formal station. These are generally discounted, however, since they were experimental and unscheduled. By 1919-1920, both XWA and KDKA were making test transmissions, but it does appear that XWA was the first to broadcast regular, scheduled programs.

This commencement of broadcasting created a great deal of interest and opened up a new era in the field of advertising, although the full significance of this new medium was not realized at the time. It also

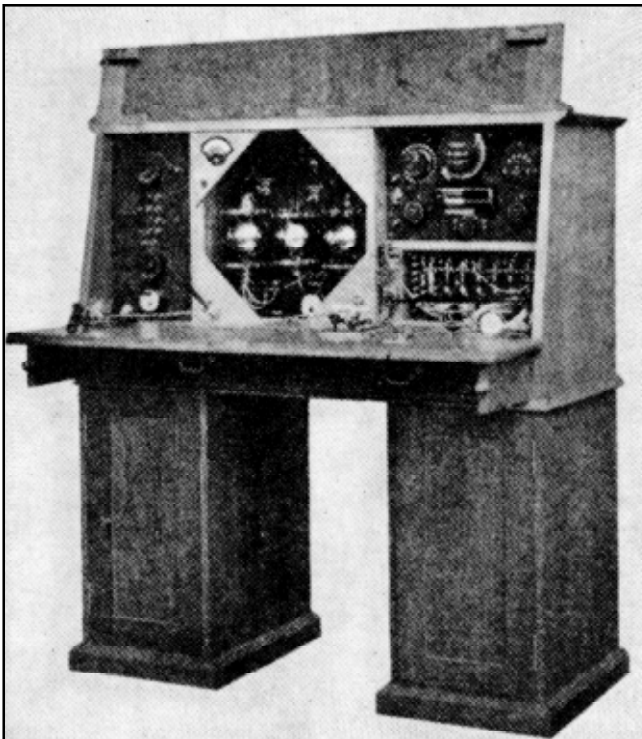


Figure 26. 500-Watt cabinet set imported from MWT factory at Chelmsford, England, and used at the experimental station XWA in Montreal. Source: Manitoba Calling, 1940, Vol. IV, No. 9, Page 8)

created new fields of activity for CMC in the manufacture of both receiving and transmitting apparatus. Most of the early stations - including XWA - were owned by manufacturers of radio equipment, who developed test transmissions into scheduled programming so that purchasers of their products would have something to listen to! Later, when the idea of sponsorship - and therefore of advertising - caught on, it produced revenue that could be used for the production of better programs than individual apparatus manufacturing companies could afford.

The first days of station XWA

Coats delivered a series of his reminiscences as broadcasts in Winnipeg. They were later reprinted in Manitoba Calling, the station bulletin. One such broadcast included the following:-

The transmitter had been shipped early in 1919 from Marconi's works in Chelmsford, Essex, England. In Montreal the radio studio was a whitewashed room on the top floor of a radio factory building on William Street. The radio set was in a vertical teak box that looked something like a piano. An engineer came up the stairs from the main floor where he had started a motor-generator which was to supply current to the wireless telephone. He entered this bare room which was the first Canadian radio studio and threw a switch. Three tubes lit up, not glowing dimly but shining with the brilliance of electric light. There was a pause of a few minutes to allow the tubes to become thoroughly warmed and ready for action. Then the engineer picked up the microphone, which looked much like a common telephone mouthpiece of that time. He held it close to his lips and spoke—thus: "Hello! Hello! This is wireless telephone station XWA at Montreal. Hello! Hello! How are you getting this? Is it clear? Is the modulation O.K.? XWA at Montreal is changing over".

The expression "changing over" meant he was ready to receive. There would have been maybe a few dozen people in Montreal at the time who were equipped to hear the transmission and understand it. The engineer was communicating with some other station operator with whom he was conducting his experiments. These first tests were on 1,200 metres (250 KHz.). Most radio traffic in 1919 was in c.w. so that the early days of voice transmissions were welcomed as a novelty. Soon the company inaugurated hour-long daily broadcasts, some of which were conducted by Coats. Some of the earliest broadcasts had been conducted by Jack Argyle, radio engineer, and J.O.G. Cann, chief engineer of CMC.

Radio programs began with the addition of music to speech at the microphone. In the beginning, the terse sentences of the engineers, thrilling as they were to experimenters, had little to interest the public, to whom they were trying to sell receiving sets. The engineers too, ran out of breath and grew tired of repeating the alphabet and saying "ninety-nine". Probably personal convenience persuaded them to do less talking and fill the intervals of testing by playing phonograph records. In the interests of economy, the company refrained from buying a phonograph. Instead they asked the proprietor of a music store on Ste. Catherine West to lend them an instrument and records in return for suitable acknowledgements on the air. Thus the first "sponsored" programs from Canada went into the hitherto undefiled ether around Montreal.

Adapted from Coats, D.R.P. Adventures in Radio – 14 & 15. In D.R.P. Coats (Ed.) Manitoba Calling, Vol. IV, Nos. 10 & 11, 1940.

SCIENTIFIC EXPERIMENTER LIMITED

11 St. Sacrament Street
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FULLY LICENSED UNDER MARCONI AND CANADIAN GENERAL ELECTRIC PATENTS

Branches and Agencies
at
VANCOUVER, WINNIPEG, TORONTO, MONTREAL, ST. JOHN, N.B. and ST. JOHNS, N.F.L.D.

Bulletin P-2
March 1, 1921.

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Amplifying
150-200 Volts
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Suitable Voltage
for
Filament Battery

Normal Filament
Current

Suitable Value of
Adjustable Resistance for
Filament Circuit

Normal Plate Voltage



TYPE "V 24"

6 Volts

0.75 Amperes

10 ohms.

22½ Volts

Figure 27. *Front page of Scientific Experimenter Limited catalog dated March 1, 1921.*

During the Fall of 1919, CMC decided to sell wireless apparatus to amateurs, and a separate company, Scientific Experimenter Limited, was formed for that purpose. Its headquarters were first located at CMC headquarters at 11 St. Sacrament St., and then, in 1922, at 33 McGill College Avenue in Montreal (Figure 27).

In parallel with their experimental broadcasting, CMC engineers were designing prototype receivers that were meant for the amateur market. One of these was a receiver using type V24 valves, made in England. The basic design was the same as the "C" set introduced later (in 1921), consisting of a detector and amplifier. A passive tuner would have preceded the detector (see Figures 28 and 29).

Another apparent prototype was the "Arcon Junior". The name was formed by leaving the letters M and I off the name "Marconi". (For many years, the cable code for the company was also "Arcon.") This receiver was possibly offered for public sale, although only one example is known to exist. It is located in the Canada Science and Technology Museum in Ottawa (Figure 30).

Still in the prototype stage of amateur receiver development, CMC produced the Type 55A consisting of 6 stages of radio-frequency amplification (V-24 valves) followed by a detector (Q valve), shown in Figure 31.

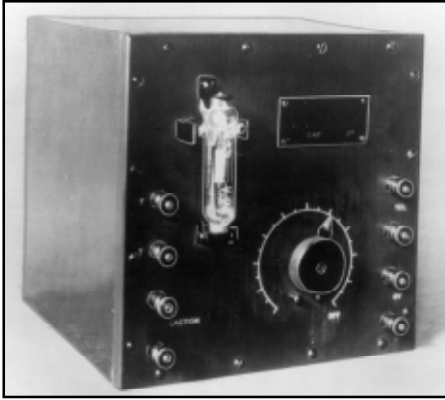


Figure 28. *Early prototype detector using a Marconi V24 valve.*

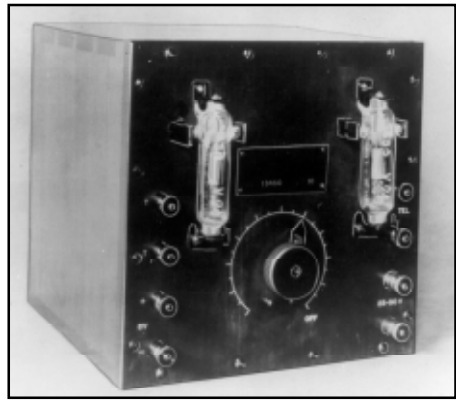


Figure 29. *Early prototype amplifier using two V24 valves.*



Figure 30. *"Arcon Junior" prototype receiving set.*

The next photo shows a Type 55A amplifier and an unknown device, probably an amplifier, the combination driving a Magnavox R-1 loudspeaker (Figure 32). The equipment is displayed in someone's garden, and the photo is dated 1920.

The first commercially produced amateur receiver was identified as the "C" set, and was first offered in 1921. It consisted of three separate boxes, a passive tuner, a detector, and a 2-tube amplifier (Figure 33). A separate power amplifier was also available. This set used the more readily available (in North America at least) UV-200 and UV-201 tubes. In March of 1921, Scientific Experimenter Limited offered only the British Marconi Q and V24 receiving valves. By the following year they listed UV-200 and UV-201 receiving tubes and not Q and V24 types. They also listed UV-202 and UV-203 transmitting tubes.

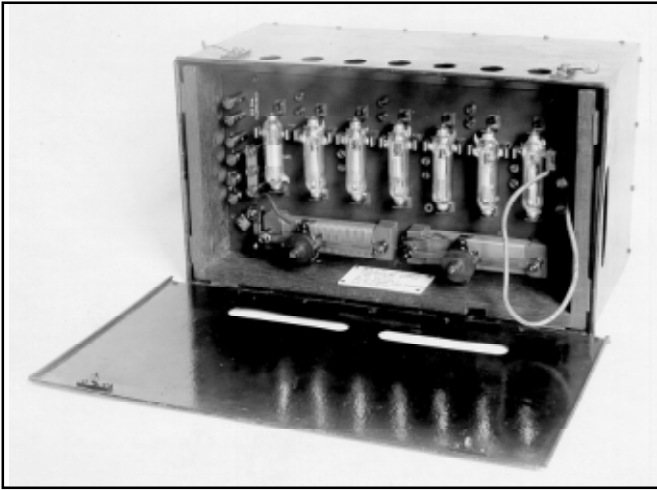


Figure 31.
Type 55A amplifier.

Figure 32.
Experimental combination of type 55A amplifier/detector, a presumed audio amplifier of unknown type, and a Magnavox model R-1 horn speaker.

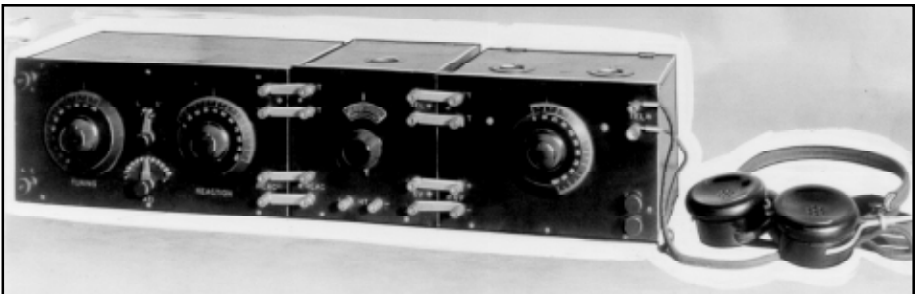
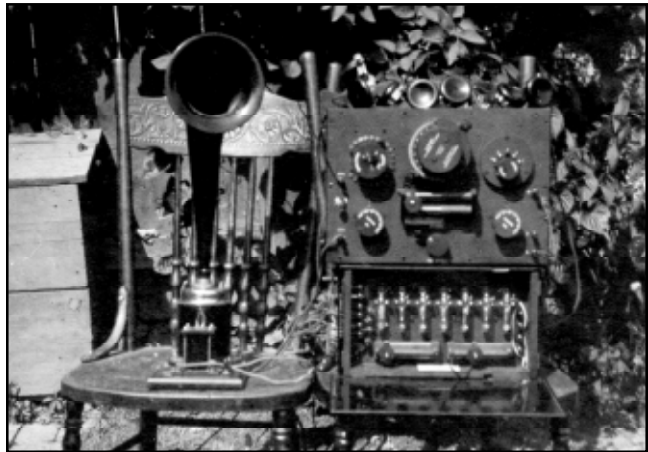


Figure 33. *Marconi "C" set.*

In 1922 they also offered two crystal sets, one had a vertically mounted coil with 3 sliders and the detector on top (Figure 34), and the other was a receiving set with variometer tuning that was intended to be coupled to the “C” set detector and amplifier (Figure 35). It also bears a striking resemblance to the AMRAD model 2575. As a result of objections from dealers and distributors, presumably because they paid less than wholesale prices and were seen as unfair competition, the operation of Scientific Experimenter Limited was discontinued in 1924.

Figure 34. *Marconi crystal receiver, catalog #139, Scientific Experimenter Limited.*

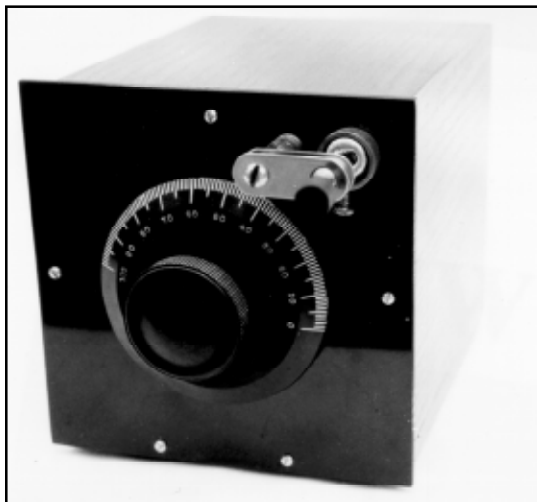


Figure 35. *Marconi crystal receiver, catalog #138, Scientific Experimenter Limited (replica by Robert Murray).*

At about this time, G. Marconi came to America to negotiate with General Electric for the exclusive world-wide rights to the new high-frequency alternator developed by Alexanderson. The negotiations were progressing favourably when the U.S. Navy intervened and blocked them. The Navy had come to believe that it was not in the best interests of the United States to permit a foreign-controlled corporation to control all its external communications by wireless and, in October 1919, they were able to bring about the formation of the Radio Corporation of America (RCA).

RCA was formed through the co-operation of a number of American companies that had interests in wireless, the principal ones being General Electric, AT&T, Westinghouse, and Western Electric. All these companies agreed to pool their wireless patents for the purpose of licensing each one to operate within its own exclusive area of activity. General Electric was the principal shareholder in the new company and entered into an agreement with it which ran until January 1, 1945. This agreement transferred to RCA an exclusive world-wide license, except for Canada, for all inventions and patents for radio purposes which General Electric then owned or might acquire during the term of the agreement.

In the meantime, negotiations were underway between General Electric and MWT regarding the takeover of American Marconi Company and its incorporation into RCA. MWT's position was primarily aimed at protecting its interests in the British Empire and certain concerns in South America. Negotiators for General Electric, on behalf of the as then unregistered RCA, were attempting to widen as much as possible their control to give them a world-wide marketing base. Canada was a special problem in these negotiations, as neither side wished to allow the other control in an area that was at the same time part of the British Empire and in such close proximity to the United States. At one point during these discussions, it was proposed that RCA take an equity position in CMC, but this was not pursued.

On November 21st, 1919, an agreement was finally concluded between RCA and MWT, running until January 1st, 1945. (RCA had, in the meantime, become duly registered in the state of Delaware.) British Marconi was to retain exclusive rights in countries of the British Empire, except for Canada where a special agreement was to be drawn up under which Canadian radio stations would be restricted to Canadian business. This agreement gave RCA an opportunity to acquire a substantial interest in CMC should it so desire. RCA was to hold similar rights for most countries in the Western hemisphere, and the rest of the world was to be treated on a competitive basis. At the same time, the parties to the agreement expressed their intention that RCA would execute an agreement with CMC concerning traffic arrangements and patents, but no evidence has been found that this agreement was ever completed.

Perhaps I should intervene at this point to make quite clear that in those days one of the most serious problems that design engineers and people in the factory had to contend with, was the lack of materials. When I refer to lack of materials I am of course thinking of the fact that we had as insulators really only four things: One was fiberboard which is very hydroscopic and hence unreliable as an insulator and it develops all sorts of warps and twists which is very bad from a mechanical point of view. The second was hard rubber which flows under pressure and hence, if you for example tightened up some terminal tonight, tomorrow it will be quite loose again. The third was slate, which was certainly firm, durable and that sort of thing but also very heavy and somewhat awkward to handle. And then finally we had various forms of porcelain insulators which were used in aerial work and the like where very high voltages were concerned. Nowadays we can turn to a wide variety of materials each of which has been designed to serve a specific purpose and which in general, whether they be insulators or otherwise, are stable under all sorts of temperature, humidity and other conditions. So I plead with you not to think that when the so called wireless designer of 50 or more years ago worked out some of the relatively crude devices that you may see in museums and the like, that he was necessarily off base. On the contrary, he had fewer tools to work with and the results of his work were very severely limited by this factor.

Unpublished recollections of S.M. Finlayson, CMC President from 1951 to 1964.

In the period immediately following WW I, there was a marked increase in Marine activities in Canada. Many new ships - in some cases whole new fleets - were built; for example, the Canadian Government Merchant Fleet was established with approximately 70 vessels, all of which were fitted by CMC with equipment of its own manufacture.

At the end of 1919, the Company purchased the building at 11 St. Sacrement Street in Montreal, and all general administrative and clerical activities were transferred to that location.

During the early part of April, 1920, new Marconi wireless telephone equipment became available, and Mr. Barrow was assigned to give the first wireless telephone demonstration in Toronto, from the Canadian Marconi Company's office in that city, to the residence of Senator Nicholls in the same city. Guests present at the latter location included members of the Cabinet and the House of Commons. On May 20, Mr. Barrow went to Winnipeg to conduct two-way wireless telephone demonstrations for the first time in that city, and in Portage-la-Prairie, some 66 miles to the west. The tests were held between May 25 and June 25, 1920. Mr. Reginald Scantlebury and Mr. Barrow set up two stations, one in Kelvin High School, Winnipeg, and the other three miles away in the supply department of Manitoba Government Telephones. Several Provincial and Civic officials and representatives of the Press were among the onlookers.



Figure 36. *Original XWA station, Montreal, 1921.*

A second Winnipeg demonstration was conducted between the Technical High School and Portage-la-Prairie. Mayor Metcalfe of Portage, President Wood of the Portage Board of Trade and the Editor of the Daily Graphic spoke with Mr. G.A. Grierson, Minister of Public Works, and other officials in Winnipeg. Tests were also made for the Winnipeg Power Company with Chief Engineer Caton attending, the stations being set up in the power plant and at Pointe-du-Bois, Manitoba. Mr. George A. Watson, Commissioner of Manitoba Government Telephones, was a constant observer throughout all the tests. Further demonstrations of the “Wireless Telephone” were also carried out in Toronto and Montreal.

An interesting point to notice with regard to these tests is that they were for the purpose of promoting the use of wireless telephony for point-to-point communication rather than for broadcasting entertainment programs to the general public. Music columnists of the Manitoba Free Press and the Winnipeg Tribune do not appear to have attended the tests. Nearly two years were to pass before the two newspapers installed broadcasting equipment and went on the air. The CMC, however, was still conducting tests with its experimental station, XWA (Figure 36).

On September 10th, 1920, an important agreement was concluded between MWT and Canadian General Electric Company Limited, which included the following provisions:

1. The holdings of CGE and MWT in CMC were to be equalized at 800,000 shares each.
2. Until December 31st, 1944, CGE were to be entitled to name a majority of the Directors of CMC.
3. CGE would grant to CMC an exclusive licence in Canada until December 31, 1944, covering all inventions and patent rights of CGE in the field of wireless telegraphy or telephony.
4. This licence excluded CGE from the use of wireless devices, but it reserved the right to manufacture them. CMC had the right to use and also to manufacture, but it could not pass to third parties manufacturing rights under CGE patents. (It seems quite clear that the Alexanderson alternator was the focal point of this agreement.)
5. CMC was to issue to CGE 1,000,000 fully paid common shares of CMC at a par value of \$2.50 each.
6. CGE was to pay CMC \$500,000 in cash.
7. CGE was to transfer to MWT about 200,000 fully paid shares of CMC.

In order to implement this agreement, another agreement dated October 1st, 1920 was completed between CGE and CMC which provided that:

1. CMC should forthwith issue to CGE 800,000 shares of CMC of a par value of \$2.50 each for patent rights.
2. A further 200,000 shares of CMC were subscribed for and allotted to CGE at par, such shares were to be paid up in cash as CMC might from time to time demand.

World War I had given a great impetus to the development of thermionic valves (or vacuum tubes, as they were coming to be called in America). This development resulted, at least as early as 1920, in the experimental use of valve transmitters, with output powers of a few kilowatts. The introduction of the vacuum tube greatly improved marine communications and created a demand for the installation of vacuum tube equipment on coastal stations and ships.

At about this time, CMC was giving serious consideration to establishing across Canada, a chain of commercial stations that could receive trans-oceanic messages directly, thereby eliminating the necessity of transferring such traffic to the land lines at Louisbourg. It was proposed that these stations would also pick up traffic for trans-oceanic transmissions. Land was acquired at La Prairie, Quebec; Toronto, Ontario; and Winnipeg, Manitoba, and a station actually was erected at La Prairie which later carried out tests. However, the plan was later abandoned.

In 1920 also, it was decided to consolidate all marine operations, and a Marine Department was established in Montreal, with full responsibility for all marine activities throughout the Company. Mr. W.J. Gray was

transferred from Halifax to take over the newly created post of Marine Superintendent.

By 1921, interest in radio programs had developed to a point at which Canadian Marconi Company felt the need for a monthly publication that would inform its readers of general progress in broadcasting and serve as a medium for radio “Hams” and others interested in wireless as a hobby to report their activities and exchange ideas. In June, 1921, *Canadian Wireless Magazine*, under editor Darby Coats, was issued as a four-page folder, price ten cents, “post free to subscribers.” The August, 1921 issue was enlarged to eight pages, and by July, 1922 had grown to a 20-page periodical, listing some broadcasting stations in Canada and the United States and reporting items of interest to home-radio builders and listeners.

During October 22-24, 1921, the Canadian challenger Bluenose defeated the American defender Elsie in a series of races held off Halifax harbour. Special arrangements had been made between the Canadian Press and CMC, with the result that two special continuous-wave transmitters and receivers were installed, one on the official press boat, the Tyrian, and the other in the Halifax offices of Canadian Press. Communication by Morse code was kept up continuously throughout the races and enabled Canadian Press to bring the results to a wide audience in record time. At

the end of each day’s races, radio-telephony transmissions were also made with great success.

Another important event that occurred in 1921 was the institution of a valve transmitter for continuous wave operation at Glace Bay Station using 24 (later expanded to 48) MT6 air-cooled transmitting valves (Figure 37). In addition, 48 rectifying valves were used; the spark equipment was retained as a stand-by. This system operated on a wavelength of 7600 meters.

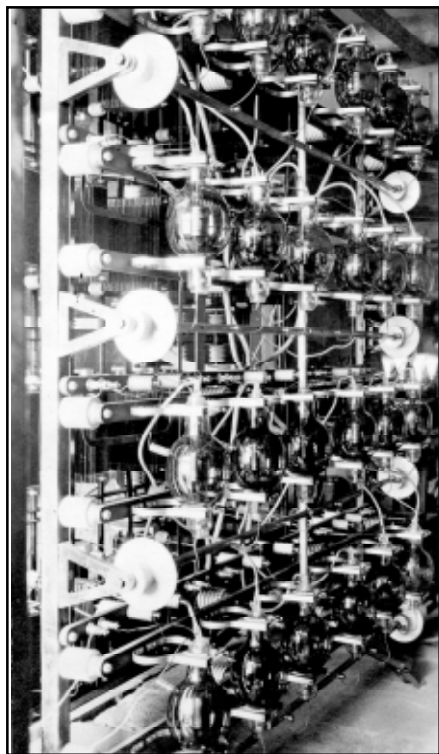


Figure 37. Glace Bay, Nova Scotia, valve transmitter.

I spent quite a bit of time at Glace Bay and its associated receiving station at Louisbourg in the years from 1922 to about 1926 or '27, partly installing and rearranging equipment and partly as what was then called a shift engineer. That involved keeping the apparatus in working condition so that the operators would have full use of the circuits to Europe during the whole day. This apparatus was very different from today's. At the time I went to Glace Bay, the spark equipment had very recently been supplanted by a so-called valve transmitter which contained, at the beginning 24 and later, 48 valves each with its own individual grid leak condenser system. Any technical man will know what a very unstable device this was. Incidentally it was a self-excited animal without benefit of any master oscillator crystal control of frequency and that sort of thing. It operated on 7,600 meters, roughly 40 kilocycles, which is a very different sort of thing to the frequencies used in today's long distance communications.

The then recently outmoded spark equipment was rather a fearsome and wonderful thing to see and especially to hear. On a still day, the spark itself could be read by ear five miles away, and that will give you some idea of the noise that existed in the condenser house where the gear was installed. They also at that time, prior to 1920, had a 20,000 volt wet cell battery which was used as a sort of a stand-by, charged part of the day and then discharged by telegraphing during the rest of the day. Anyone who loved batteries as little as I did could have a real nightmare contemplating the upkeep of some 10,000 individual cells.

Unpublished recollections of S.M. Finlayson, CMC President from 1951 to 1964.

In 1921, a new agreement was concluded with the Canadian Government covering the operation and maintenance of eight stations on the Great Lakes and 18 stations on the East Coast and the St. Lawrence River. This agreement was made for a period of five years and superseded all previous agreements for the operation of Coast Stations. It provided for an annual subsidy of \$5,500 for each station, and CMC was still entitled to retain all Coastal Station tolls. The agreement also stipulated that CMC would charge only half the commercial rates for all Canadian Government messages.

During the latter part of the year 1919, ships almost halfway across the Atlantic were communicating directly with Barrington on the south coast of Nova Scotia and with WCC at Cape Cod, Massachusetts, thus eliminating the toll charge from local stations along the coast such as Cape Race, Sable Island, and Camperdown. During the years 1920 to 1922, these activities intensified to a considerable degree and the Company set up station VAS ("Voice of the Atlantic Seaboard") with a high-power continuous wave transmitter in Glace Bay and a receiving station in Louisbourg, Cape Breton, which permitted it to offer shipping companies a duplex automatic high-speed service up to 1,500 miles off-shore. In 1921, Louisbourg was also the site of a demonstration of the practicality of operating two centrally controlled wireless stations on one site, the so-called "radio central" concept.

In 1922, CMC equipped its first formal broadcasting studio, located in the Canada Cement Building on Phillips Square, Montreal, and the Canadian Government assigned it the call letters CFCF, which are still being used. Radio was in its infancy at that time, but a great deal of interest had been awakened, and many studio and remote programs were broadcast from that location. Later, the equipment for what is now Canada's senior French-Canadian station, CKAC, was assembled and tested in a corner of CFCF's new studio prior to its delivery to La Presse newspaper. Marconi radio engineer Leonard Spencer worked on the set in CFCF's quarters and became engineer-in-charge in the La Presse building.

Marine operations continued to expand during this year and the first direction-finding equipment (which was developed by the Company's engineers) was installed on ships (MDFR-1, Figure 38). During this year, also, a service was established at Glace Bay Station to supply weather reports and news to ships.

At this time, Great Lakes ship spark transmitters and Coast Stations spark transmitters were changed from 600 to 450 meters, as the former interfered badly with broadcast reception. This change made it necessary to rebuild certain parts of the equipment.

An event occurred in 1923 that was to have an important bearing on the future activities of the Company for many years. This was the signing of agreements on March 7th with CGE and the Radio Valve Company of Canada Ltd. (RVC). The latter company had been incorporated in November 1922 for the purpose of acquiring, as a going

concern, the business of CGE in connection with the manufacture and sale of thermionic valves, which had previously been carried on by CGE at its factory in Toronto.



Figure 38. *Marconi Direction Finding Receiver model MDFR-1.*

The most important provisions of the agreement may be summarized as follows:

1. CMC and CGE would each subscribe in equal ratio for the Capital Stock of RVC. (The amount actually subscribed totalled \$100,000 each.)
2. CGE would be entitled to nominate three of the five directors of RVC.
3. RVC would be entitled to receive the full benefit of all patent rights, present and future, belonging to or controlled by either CGE or CMC, for a term up to December 31st, 1944.
4. RVC undertook not to supply or sell thermionic valves to any entity other than CMC but the latter agreed to ensure that CGE would be supplied with its requirements at a price equal to that charged to CMC plus a profit of 10%.
5. CMC agreed to purchase all its thermionic valves from RVC.

It appears that the agreement on the part of CGE to pay CMC 10% profit on all valves supplied to CGE was mainly due to the dominant patent position of CMC. Also, of course, CGE had, at that time, a large shareholding in CMC. In any event, this arrangement remained in effect until 1944 and provided a substantial source of revenue for the Company.

Another important agreement, known as the “Canadian Radio License Agreement” was also concluded in 1923. It was signed by CGE, MWT, the Canadian Westinghouse Company Ltd., The Bell Telephone Company of Canada Ltd., the Northern Electric Company Ltd, International Western Electric Company Inc., and Rogers Majestic. It provided for cross-licensing under the patents owned or controlled by the parties to the agreement and was drawn for a minimum period of 10 years, after which any one or more of the parties could withdraw by giving one year’s notice in writing. However, with respect to CGE only, the agreement was to be terminated in any case at December 31st, 1944. Actually, the basic principles established by the agreement continued to be effective, with some minor changes, until at least 1956.

In the Marine Department, 1923 saw the beginning of the conversion from spark to the new 4KVA CW-ICW transmitters in all Canadian Government Coast Stations. These new sets were designed and developed by CMC, and the change-over program extended over a period of about two years. The first experimental station was established in Montreal, but the first production equipment was installed at the wireless station in Toronto. Both the Montreal and Toronto stations had 2-kW plate input, all others having 4-kW.

Broadcasting was continuing to gain popularity as new receivers for domestic use became available, but this activity had not yet developed to

the point of producing revenue. In 1923 CMC produced its second domestic broadcast receiver, the Marconiphone Mk I (Figure 39). The set consisted of two boxes with sloped front panels, a tuner/regenerative detector and a two-stage audio amplifier. The list price was \$50. In 1924 an electrically equivalent set was introduced, the Marconiphone Mk II in a larger and different style cabinet (Figure 40). The list price in 1924 was \$90. The complete record of CMC domestic receiver production from 1921 to 1931 is shown in Table 2.

The year 1924 also saw the introduction of a series of receivers with tuned radio frequency (TRF) designs. The first of these was the Marconiphone



Figure 39. Marconiphone Mk I receiving set.
Source: Robert Murray collection



Figure 40. Marconiphone Mk II receiving set.
Source: Robert Murray collection

Table 2. CANADIAN MARCONI COMPANY DOMESTIC RECEIVERS, 1921-1931

Model 'C'	First Produced M M ? 1921	No. of Tubes 1/3	List price \$105.00	PWR DC	Circuit type Regen	Band	Style Table	Comments ST-1 Tuner; VD-1 Det; AA-1
Amp								
Mk I	? 1923	3	\$50.00	DC	Regen		Table	
Mk II	? 1924	3	\$95.00	DC	Regen		Table	
Mk III	? 1924	5	\$300.00	DC	TRF		Table	
Mk IV	? 1924	4	?	DC	TRF			Chassis only
Mk V	? 1924	7	\$600.00	DC	TRF		Cabinet	Queen Anne
Mk VI	7 1925	4	\$115.00	DC	TRF		Table	
Mk VII	7 1925	8	\$250.00	DC	Super		Table	
Mk VIII	8 1926	5	\$125.00	DC	TRF		Table	
Mk IX	8 1926	6	\$115.00	DC	TRF		Console	
Mk X	8 1927	7	\$325.00	AC	TRF		Console	
11	8 1928	6	\$160.00	DC	TRF		Console	
12	8 1928	7	\$265.00	AC	TRF		Console	
13	9 1928	8	\$475.00	AC	TRF		Console	"Thermionic;" Combo
14	8 1929	7	\$160.00	DC	TRF		Console	"Triumph" Series; 6V
15	8 1929	9	\$175.00	AC	TRF		Table	"Triumph" Series
16	8 1929	9	\$268.00	AC	TRF		Console	"Triumph" Series
17	8 1929	9	\$365.00	AC	TRF			"Triumph" Series; Combo
18	8 1929	9	\$890.00	AC	TRF		Auto	"Deluxe Triumph;" Combo
19	7 1930	7	\$150.00	DC	TRF			"Superior;" 2V
20	7 1930	8	\$185.00	AC	TRF			"Junior"
21	7 1930	7	\$225.00	AC	TRF			"Standard"
22	8 1930	9	\$285.00	AC	TRF; AVC			"Senior"
23	8 1930	9	\$385.00	AC	TRF		Console	"Senior" Combo
24	12 1930	8	\$295.00	AC	TRF			"Junior" Combo
26A&B	7 1931	7	\$89.50	AC	Super		Mantel	
26C	7 1931	7	\$119.50	AC	Super		Console	
26SW	8 1931	9	\$164.50	AC	Super	S	Console	"International"
27SW	11 1931	11	\$198.50	AC	Super; AVC	S	Console	"Deluxe International"
28	11 1931	4	\$49.50	AC	TRF		Mantel	"Bantam"

Note: The entire production table until 1950 has been published by Roger Hart in the Ottawa Vintage Radio Club Newsletter, 1999, Volume 7, Numbers 1 to 3, and as a supplement to Radio Waves, the publication of the Canadian Vintage Radio Society, 1999, Volume 7.

Mk III, a sloped front receiver of substantial proportions (the panel was 14.5" x 22") whose presence would have been noted in anyone's parlour (Figure 41). It used five tubes, and its price in 1924 was also substantial at \$300.



Figure 41.
*Marconiphone Mk III
receiving set. Source:
Robert Murray
collection*

Little information remains about the Marconiphone Mk IV, except that it was also a TRF set made in 1924, which used four tubes. The Marconiphone Mk V (Figure 42), also produced in 1924, appears in its original advertising photo to be of a similar panel layout to the MK III. It is again a TRF housed in a stylish floor cabinet, and is described as the Queen Anne model. It used seven tubes and cost \$600 in 1924!



Figure 42.
*Marconiphone
Mk V, Queen
Anne model of
1924.*

For many years prior to 1924, the subject of a communication system to serve the entire British Empire - the so-called Imperial Wireless Scheme - had been under discussion in England and between the British Government and the Governments of other Empire countries. As early as 1913 a plan had been completed for the establishment of a network of stations in different parts of the Empire, but the outbreak of WW I brought everything to a halt. Following WWI there was a great deal of further discussion on this subject but it was not until 1924 that a decision was reached to proceed on the basis that the British Post Office would own and operate all wireless stations in Great Britain communicating with the Empire.

In the meantime, experimental results had convinced Marconi and his engineers that a new means of long-range communication was now feasible which would completely outmode the long-wave high-power stations that had originally been intended for the scheme. This revolutionary method was to achieve the required performance by means of short-wave “beam” stations, which would cost much less than the original design, use only a fraction of their power, and have a theoretical capacity of up to 400 words per minute.

The proposal to erect the new beam stations was put before the Governments of the various Empire countries by MWT and was unanimously accepted. As a result, CMC entered into an agreement with MWT which provided that the latter would construct the Canadian stations, CMC acting as their agents for this purpose, and that upon completion,



Figure 43. *The opening of the Transoceanic Beam Service from Montreal, August 1926.*

CMC would purchase the stations from MWT on what amounted to a cost-plus basis. Sites were acquired in Yamachiche and Drummondville for the receiving and transmitting stations respectively. They were to be connected to a Central Telegraph Office to be established in the Marconi premises on St. Sacrement Street in Montreal (Figure 43). The final cost of these stations was in excess of \$1,000,000.

During 1924, the first revenue was received from the operation of broadcasting station CFCF.

The construction of the new Beam Stations went forward rapidly in 1925, and negotiations with the British Post Office towards an agreement for handling traffic between Canada and England were started.

During the period 1923-1925, several new CW/ICW valve transmitters (type 100 W3, W4, and W5 sets) with power outputs of 50 to 500-Watts were installed in Canadian coastal stations. One Alexander McLean, having a bad hair day, is shown operating the Belle Isle station in the winter of 1925 (Figure 44).

Under the date of June 12th, 1925, an amendment was issued to the Company's Act of Incorporation, which provided for the following changes:

1. The name of the Company was changed to Canadian Marconi Company.
2. The par value of the Capital Stock was reduced from \$2.50 to \$1 per share, and the authorized Capital increased to \$7,500,000.
3. The Company was permitted to conduct a business of telephonic communication by means of wireless telephony and to transmit telegraph and telephone messages for the public and collect tolls therefor.



Figure 44. Alexander McLean operating Belle Isle Radio, winter 1925.

In 1925, Further progress was made in the production and sale of broadcast receivers and accessories. The Marconiphone VI broadcast receiver was introduced in July of 1925 (Figure 45). It was another TRF set in a large (28" wide) table cabinet. It consisted of four tubes and cost \$115. Also in July of 1925 came the Marconiphone VII, CMC's first superheterodyne (Figure 46). It used 8 tubes and cost \$250. Sales must have been disappointing because CMC did not try another superhet until model 26 in 1931. Broadcasting activities also increased, and CFCF earned a total of approximately \$12,000.

The new beam stations were officially opened on October 25, 1926, when the circuit between Canada and England was put into operation. This inaugurated a new era of wireless communication, which later led to the extensive "Via Marconi" Empire network. Also, in the same year, an agreement with the British Post Office, covering the handling of traffic on the circuit between Canada and England, was concluded. During 1926, negotiations were entered into with both the Canadian and Newfoundland Governments with a view to obtaining a revision of the subsidy for the operation and maintenance of Coast Stations owned by these Governments. Also in 1926, a new 500-Watt CW-ICW long-wave transmitter was produced and installed on ocean-going vessels.



Figure 45. *left*
Marconiphone
Mk VI receiving
set.

Figure 46. *right*
Marconiphone
Mk VII receiving
set.



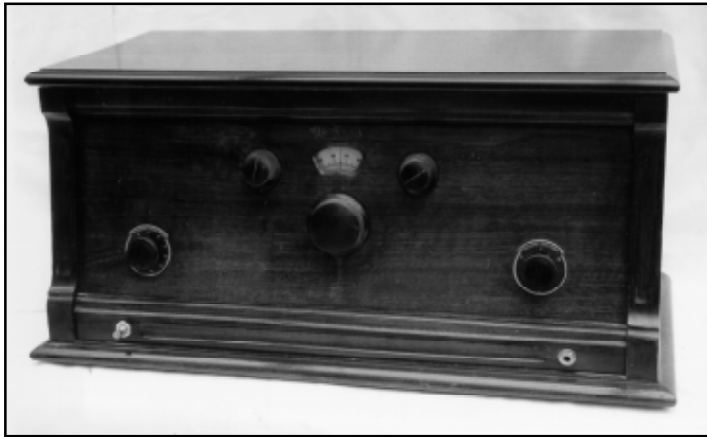


Figure 47. *Marconiphone Mk VIII receiving set.*
Source: Robert Murray collection

With the opening of the beam service, the Company's high-power station at Glace Bay, previously used for communication with England, was closed down and the cost of the necessary transfer of operations was written off during the year.

In August of 1926, Marconiphone receivers models VIII and IX were added (Figures 47 and 48). Model VIII used 5 tubes and sold for \$125, while model IX used 6 tubes and sold for \$115. Both used a TRF design. Looking at these models today, it is difficult to see why the model VIII should have been the more expensive of the two.

In 1927, 2,250,000 shares of CMC stock were sold to a holding company in which Robert Brand and Sir Robert Kindersley, on behalf of Lazard Brothers Ltd., were the major force, with the Radio Corporation of America a non-voting partner. The new company was incorporated



Figure 48. *Marconiphone Mk IX receiving set.*

on June 25, 1927 under the name “Canmar Investment Company Limited” with an authorized Capital of 5,000 Class “A” shares at a par value of \$1 each, and 18,500 Class “B” shares at no par value. Voting rights were held exclusively by the owners of Class “A” shares. MWT received 1,000 Class “A” shares as part payment for the CMC shares sold to Lazard Bros, which of course gave them control of Canmar and indirectly of CMC. This situation existed until 1940 when the interests of Lazard Bros and MWT were acquired by Cable and Wireless Ltd.

The main objectives of this agreement appear to have been to ensure that ownership and control of CMC would remain in British hands, and to provide that RCA and its connections would be the normal routing for all radio traffic received by CMC from stations of the British Empire radio chain or other places, destined to the United States and other countries of the American Continent south of Canada. RCA and Lazard wanted a CMC alliance with the Canadian Pacific Railway (CPR) in order to forestall the possibility of CPR (Canada’s leading telegraph company) joining with American telegraph companies in a competing wireless venture. CPR did, in fact, acquire a small interest in CMC, but not before CMC had switched its receiving and distribution contract to the Canadian National Railway (CNR), (effective November 1, 1928).

The relationship between the par value of CMC shares and the trading price during this period is interesting. In 1927, when CMC stock with a par value of \$1 was selling on the New York Curb Exchange at around \$3, the company president, J.W. Flavelle issued a statement saying that the price was unwarranted. Still, by November 1928, the price had risen to over \$28.50, giving the Company a market value of \$129,789,000, despite the fact that it had assets of only \$5,000,000 and earnings of \$.01 per share! Deeply concerned by this situation, Flavelle gave an interview with Floyd Chalmers of the Financial Post in which he repeated his earlier statement that the stock had been overpriced even at \$3.00. In two days, it fell from \$28.00 to \$8.00, then rallied to \$9.00 to \$10.00, still 900 to 1000 times earnings.

On July 1st, 1927, an historic event took place in which the Company’s beam station at Drummondville and station CFCF in Montreal played an important part. This was the great Jubilee Broadcast from Parliament Hill in Ottawa, which was arranged to commemorate Canada’s Diamond Jubilee. Through the co-operation of the telephone and telegraph companies and broadcast stations throughout the country, the broadcast was heard across Canada, and the transmission from Drummondville was heard in many other countries. H.M. Short, then Managing Director of CMC, was a member of the Diamond Jubilee Broadcast Committee.

The factory was concerned with basically two things. The supply of equipment for our marine services both on ships and on coast stations, and allied to it a certain amount of broadcast equipment which was, in part at least, manufactured in our factory at William Street. The other major effort was concerned with production of broadcast receivers, which at that time tended to be produced only from about the beginning of July until around Christmas time. Then there was a complete lull and absolute cessation of production from about the beginning of the year through until early Summer. This period, although an idle one from the factory point of view was a very busy one from the design point of view. It was during the early months of the year that the sales people provided the design engineers and the factory with their ideas as to what the market would require and then there were the usual processes of technical design, the preparation of drawings, the preparation of models, certain kinds of field testing and finally an authorization for production. In those days, the quantities manufactured were relatively small and as I recall our output was limited to 50 or 100 sets a day at the peak. Unpublished recollections of S.M. Finlayson, CMC President from 1951 to 1964.

Arising out of the Canadian Radio License Agreement of 1923, a new agreement was drawn up dated January 19, 1927 that covered the incorporation of Canadian Radio Patents Ltd., which was established for the purpose of pooling the patents of the shareholding companies and issuing licenses to other Canadian manufacturers on a royalty basis. Under this agreement, CGE, CMC, Canadian Westinghouse Company, Ltd., and Northern Electric Company Ltd., each received 6,250 shares of the new company, and Standard Radio Manufacturing Corporation Ltd., received 2,500. The par value of the shares was \$1 each.

In the Marine Department, short-wave transmitters were designed and installed for point-to-point communications. By that time, government regulations made it compulsory for certain types of vessels to carry automatic alarm devices, enabling them to dispense with one of their operators, the 'watcher.' The auto-alarm operated a bell when a signal of three 3-second dashes, spaced one second apart, was received. Twelve such dashes and spaces were always sent out before an SOS signal. CMC manufactured these devices, and benefited greatly from sales to meet the new requirement.

The volume of business in broadcast receivers and valves continued to expand and the Company produced its first AC receiver, the Mark X in August, 1927 (Figure 49). This was a seven-tube TRF set costing \$325. By this time, broadcasting was becoming established as an advertising medium, although CFCF was still operated as a branch of the Sales Department. In June, 1927, the station was moved from the Canada Cement Building to the Mount Royal Hotel, where it remained for several years.

In 1928 an Empire Government Conference was held in England and resulted in the formation of a merger company to combine the respective interests of Cable and Wireless and MWT in Great Britain. This new company was called "Cable and Wireless Ltd." and had as its object the acquisition of the stocks, shares, debentures and other obligations of the various companies concerned, including MWT. In addition, a separate communications company was formed under the name "Imperial and International Communications Ltd." This company acquired the physical assets of the same group of companies relating to communications, in exchange for shares, thus segregating in one company the communications aspect of the undertaking. The inclination of Joseph Flavelle, President of CMC, at that point seems to have been to sell CMC to I&IC, thus retaining British control. This move, however, appears to have been blocked by David Sarnoff and Owen Young of RCA, who felt that a new manager should be found for the company and that it would then be capable of a greater degree of independence, and by Canadian Prime Minister R.B. Bennett, who was diametrically opposed to greater British control of Canadian industry. As a result, Flavelle offered to resign, but was convinced to stay until 1934, when he handed over the post of President to Perry, the same year in which CMC was, in fact, finally acquired by I&IC. Two years later, Flavelle resigned his post as Chairman of the Board and retired. The Beam Services were extended in 1928 by the opening of circuits for communication with New York and Australia. Also during this year CMC's manufacturing business continued to increase and the first broadcast receiver components were manufactured.

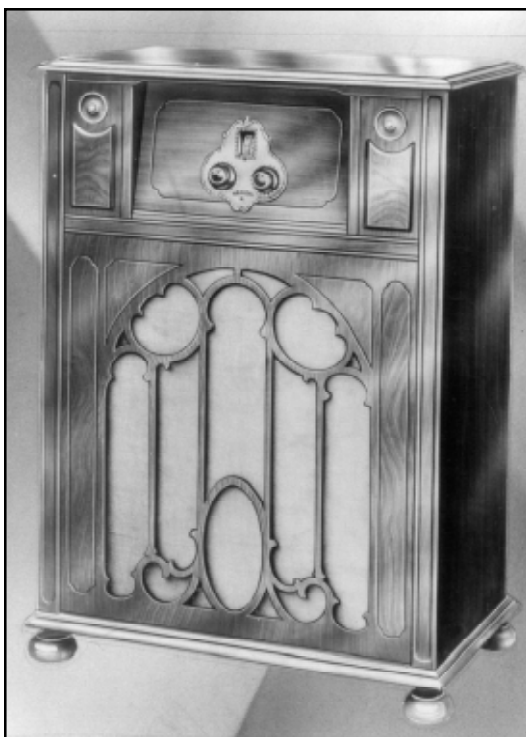


Figure 49. *Marconiphone Mk X receiving set.*

Broadcasting activity continued to expand in 1928 as its value as an advertising medium became more widely recognized and the gross revenue from CFCF increased. Broadcasting, however, was having a difficult time getting established in Canada because the economics of the business were at best difficult. As historian Michael Bliss puts it, “The trouble with Canadian radio was American radio. Powerful American stations had always covered Canada more thoroughly than home-grown transmitters. With the creation of national radio networks by the end of the 1920s, the Americans began broadcasting hugely popular entertainments that no Canadian producer could possibly match.”

The year 1928 also saw the first of many trans-Atlantic broadcasts. When a Thanksgiving Service for the recovery of King George V was broadcast by the BBC from Westminster Abbey in London, England, this transmission was picked up by the CMC station at Yamachiche and sent all over Canada via the CNR network. The Thanksgiving Service was followed on November 11 of that year by the Armistice Service from Whitehall, and two months later by a live broadcast of King George V speaking at the opening of the Navy Parley in London.

The year 1928 also saw the introduction of three new broadcast receivers, models 11, 12 and 13. The Model 11 was a seven-tube battery operated TRF set that cost \$160 in a console cabinet. Models 12 and 13 were seven and eight tube sets respectively, both TRFs, costing \$265 and \$475

in console cabinets. Both were AC operated. The Model 13 was the company’s first combination radio and record player (Figure 50).



Figure 50. *Marconiphone Mk 13 radio-gramophone combination.*

I well remember that our whole shipping department would be completely plugged by say 30 or 40 receivers at one time. It must also be appreciated that although these receivers were in both the mantle or table form, and in the self-supporting cabinet form, they were all very much bigger than what was to be the norm in later years, at least until we got into the production of Hi-Fi units. The reason for this was that the market seemed to demand a larger unit than was the case in the 1930's, and also because structurally it was not possible to reduce the size very much. One of the major elements was that in the very late twenties we began to include loudspeakers and these in themselves were quite large, probably 18" x 18". The components available at those days were much larger than we are accustomed to in recent times, and we had a number of deficiencies I suppose you would call it in the methods used in assembly. Consequently space was wasted as compared with later years.

Our receivers of the self-supporting cabinet form were crated in what were then called wirebound boxes, which in turn were rather cumbersome things. They were certainly a lot more awkward and difficult to deal with than the modern carton, with its very appropriate packing elements. In many cases we had difficulty in storing in the limited space in the factory the components and in particular the cabinets that were needed from day to day. Consequently we had to work on a somewhat hand to mouth basis, depending upon suppliers to deliver perhaps twice a day or maybe even three times a day in order that our incoming and outgoing shipping, boxing and unloading facilities would not be completely swamped.

Unpublished recollections of S.M. Finlayson, CMC President from 1951 to 1964.

In the Broadcast Receiver Division, sales continued to increase for the first nine months of 1929. The dynamic speaker was introduced. Towards the end of the year, however, the depressed state of the economy resulted in a sharp drop in demand for domestic receivers, and inventories grew rapidly.

There was a further expansion of broadcasting activities in 1929, and the gross revenue increased to almost three times that of 1928. The net profit on the operation of CFCF also increased.

From the Company's point of view, the most important event in 1930 was undoubtedly the move of the production facilities on May 1, to a new factory that had been erected in the previous Fall and Winter in the Town of Mount Royal (which is now, in 2001, a suburb close to the center of Montreal), at a cost (including land) of approximately \$275,000. This new plant represented the latest in modern manufacturing efficiency, and the public was invited to the official opening, which took place during the week of September 8th to 13th. The original land consisted of three acres between Canora Road and the Montreal city line.

The rear section of that area was then owned by the CNR, who had reserved it for a line leading to a team track to be erected at Rockland

Avenue. The original parcel was purchased for 15 cents per square foot; a subsequent parcel was purchased for a mere 5 cents per square foot when the Town of Mount Royal sold it to recover unpaid taxes.

The move to the new facilities marked the beginning of a new era in CMC's development, as it provided much improved working conditions as well as ample room for future expansion. The Head Office of the Company, however, remained in the Marconi Building at 11 St. Sacrement St. in Montreal.

In the Marine Department, a new agreement was entered into with the Canadian Government covering the operation and maintenance of Canadian Government Coast Stations for a period of one year on the basis of cost plus 10%. Also, during 1930, short-wave radiotelephone service was established between the Glace Bay Station and ships at sea. Revenues from station CFCF continued to increase.

An interesting event in 1930 was the unveiling of a monument to General Wolfe, the victor in the 1759 battle to take Canada from the French. It took place at his birthplace in England. The ceremony was broadcast on a national network in Canada in which CFCF was the key station, and the Marconi facilities at Yamachiche were used to send the broadcast across the Atlantic.

Also in 1930, CFCF became an affiliated station of the National Broadcasting Company (NBC) and thus had available to it most of the programs originated by NBC on its Red and Blue networks. It is interesting to note that up to the time of this affiliation, listeners in the Montreal

areas spent much of their time tuning in American stations. However, after the advent of NBC programming on CFCF, they stayed with the local station and not only heard the programs of foreign origin but were content to listen to the majority of the programs which were of local origin.



Figure 51. *Marconi model 26 broadcast receiver.*

Source: Robert Murray collection



Figure 52. *Broadcast receiver assembly line, 1931, showing mostly model 26 mantel sets.*

The total sales of manufactured products increased during the year but higher distribution costs reduced the Net Profit. There was also a loss shown on the operation of the Beam Stations, but operations for the year resulted in a small net profit. On the domestic side, fierce competition forced price reductions, with a resultant decrease in margin.

This was the depression period and business was carried on under very difficult conditions. Sales revenue dropped to less than 50% of the 1930 volume and despite every effort to reduce costs, the manufacturing and selling operations showed losses in each of the three years. Operations in other departments were similarly affected, with the result that the Company showed losses in 1931, 1932 and 1933.

Five new broadcast receivers were introduced in 1929. These were models 14 (a seven-tube battery console for \$160), 15 (a nine-tube table set using AC, for \$175), 16 (a nine-tube console using AC, for \$268), 17 (a nine-tube radio-record player combination for \$365), and 18 (a nine-tube deluxe combination for a whopping \$890!). All of these sets were TRF. Evidently the year's models were designed and released (in August) before the impact of the depression was felt.

Six new models were released in 1930, models 19 to 24. All were again TRFs. CMC did not return to manufacturing superhets until the following year, 1931. The 1930 model prices ranged from \$150 to \$385, a slight decline from the 1929 prices. CMC's first mantel (or "Depression") set did not appear until 1931—the model 26 (Figures 51 and 52). To

describe this set as small is a euphemism, since it stands over 18" tall. Its price in 1931 was \$89.50, and it was a seven-tube superhet. CMC had not charged a lower price than this for a receiver since the Mk I in 1923 (assuming that there was no effect of inflation at the time). Also in 1930 there was a model 28 TRF 4 tube "Bantam" mantel set for \$49.50.

In 1931, CFCF, now located in the King's Hall Building at 1231 St. Catherine St. West in Montreal, was the moving spirit in the creation of Canada's first radio network. This comprised a group of stations in London, Ont., Hamilton, Toronto, Ottawa, Montreal, Moncton, Halifax, and Fredericton. The CNR, which owned stations in Ottawa and Moncton, contributed its telegraph lines and the stations in turn made programs available to the network.

4. Epilogue

Canadian Marconi survived the depression of the 1930s although its revenues fell like those of many other companies. The advent of WWII led CMC into the military communications sector, where it made a major contribution to the war effort with equipment such as the famous No. 19 "tank" transceiver. After the war, product lines were diversified to include commercial radio equipment, military electronics, and avionics (electronics apparatus for aircraft). By the early 1960s CMC was deemed to be in conflict of interest due to the fact that it both owned a broadcasting station (CFCF) and manufactured domestic radio and television sets. Consequently, the Company sold its broadcasting interests and ceased the manufacture of domestic equipment. The 1950s brought the development of new airborne systems, notably the Doppler Navigation System, sophisticated military communications equipment, and high-reliability electronic components. During all of that period, GEC in the United Kingdom held a controlling interest in the outstanding shares, and when part of that empire was sold to British Aerospace, the Canadian Marconi name disappeared, the Company being re-named British Aerospace Systems (Canada) Inc. (BAeS(C)I). By April, 2001, ownership had again changed hands, with the sale of BAeS(C)I to Onex Corporation. As of April 10, 2001, BAeS(C)I has been re-named CMC Electronics, Inc.

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Note. All figures are from CMC original photos, via the collection of Roger Hart, unless otherwise noted.

Authors' Biographies:

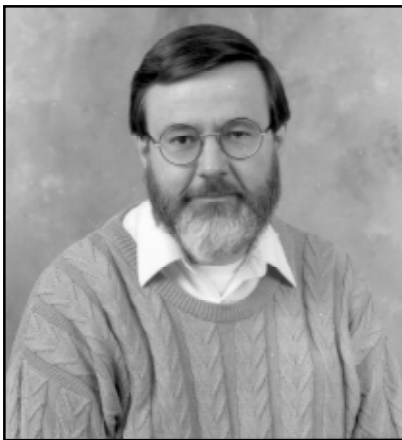
Roger Hart

Roger Hart first became interested in radio when he spotted a No. 19 military radio in a surplus store at the tender age of 11, and saved to buy it a few months later. By 1964 he was a licensed radio amateur G3SHM. He has since held the calls VE3BOH, FP0VX and VE7SF, and he is now VA3OA. In 1981, his radio interests turned to the history of the art when he joined Canadian Marconi Company in Montreal, Quebec.



During his 15 years with CMC, Roger was Manager of Marketing Services and part-time Company historian. He has been a member of the AWA since 1985, and is also a member of the Radio Club of America, the British Vintage Wireless Society, and the Scientific Instrument Society. Roger left CMC in 1996 when he and his wife Carol bought Old Authors Bookshop in Morrisburg, Ontario, where they specialize in books on early electrical communication.

Robert P. Murray Winnipeg, MB, Canada



Bob was born in 1944 in Summerside, Prince Edward Island, Canada. Bob's interest in radio goes back to the things his father taught him about it, and of course to the building of his first crystal set. His father had been a ham "before the war" by which he meant in about 1913. Bob's interest in *antique* radios began when a friend in graduate school started an antique store in Winnipeg, and sold him a Phenix Ultradyne with a horn speaker. Then his wife, Eileen, came home after a weekend in rural Manitoba with a Northern Electric model R-4. From his father Bob knew what a "peanut" tube was, and he proceeded to get more interested in the hobby.

Like many collectors he at first emphasized diversity in his collection. He attended the Minnesota regional meetings of the AWA where Joe Pavsek would demonstrate his early spark apparatus, and members would offer help and advice to fledgling collectors. From there he learned about the annual meetings in Canandaigua. Gradually his collection shifted to emphasize broadcast receivers made in Canada in the 1920s. He participated in AWA contests and was further motivated by winning the Bruce Kelley OTB Award in 1992 and again in 1995.

Bob holds a PhD in experimental psychology, and currently is Professor, Community Health Sciences, Faculty of Medicine, University of Manitoba. At work there is not an antique radio in sight, but there is ample opportunity for Bob to practice his scientific writing style.

Bob worked briefly for Bell Canada headquarters in Montreal while Eileen completed her residency in Dermatology, from 1972 to 1974. He remembered the Bell historical display he had visited as a child, and he still has friends in the head office who have eased his access to the Bell archives. On his first visit there, one of the staff said, "There is some fellow in Winnipeg writing about radio history in the OTB. Do you know him?" The Northern Electric archives are held by the Bell Historical Collection, and Bob has been working on and off on this story of Northern Electric radio for more than ten years.

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