Radio Operator Training at the Radio College of Canada: 1928–1964

"In this sign you will Conquer"

It has been estimated that some 40,000 people graduated from Radio College of Canada (RCC) since it was established in Toronto in 1928.[1] RCC was one of several schools that trained radio operators in radio technology, Morse code, and the duties of radio operators on board ships. RCC published RCC Service Manuals, long an essential source of information for radio servicemen and now a collector's item. Thousands of people in the Canadian radio industry learned their skills from the technician and technologist courses at the college. There is no single source of the history of the RCC, perhaps because of the wide range of courses and publications it offered over the years. The author obtained his Second-Class Certificate of Communications from RCC in 1959, but only recalls the Radio Operator (RO) program—the primary subject of this article. The RO program of RCC was offered from around 1932 to 1964, when the Department of Transport, then the largest employer of graduates of the RCC RO courses, established its own radio operator training school near Ottawa. In its early years, starting in 1928, the two major activities of RCC were the publication of service manuals and technical and technologist courses. These two activities are briefly mentioned as they established the credibility of Jas C. Wilson, founder of RCC, to launch the RO program.

Background

A few highlights of the history of radio and marine communications in the first decades of the 1900s are needed to place RCC in its proper historical context.[2] A comprehensive coverage of the early days of radio in Canada can be gleaned from the many excellent histories still in print. From the viewpoint of the knowledge requirements and training of radio operators, the advent of high-power vacuum tubes and the gradual demise of spark in the early 1920s were perhaps the most significant technological developments. These events led to changes in the qualifications of radio operators, and therefore directly affected the curriculum of RCC radio operator courses.

In 1901 the Marconi Wireless Telegraph Company of London opened the first wireless school in Frinton-on-Sea, Essex, England, naming it the Marconi School of Wireless Telegraphy.[3] In 1902 the Marconi Company of London established the Marconi Wireless Telegraph Company of Canada, and the Department of Marine and Fisheries commissioned the newly formed company to build six stations along the St. Lawrence River and the Gulf of St. Lawrence. Wireless became recognized as an essential element in the shipping world in 1909 following the collision of the British White Star liner *Republic* with the Italian liner *Florida*, in which radio operator Jack Binns was acclaimed a hero.

Training in these early days in Canada was provided by the Canadian Marconi Company, which brought their instructors from England. Just prior to the start of WWI, Antonin Blouin opened his school to teach Morse code and meteorology on William Street in Montreal. In 1915 a school of instruction for operators was established in Montreal under the direct control of the Canadian Marconi Company.

The importance of wireless communications was dramatically heightened on April 15, 1912, with the sinking of the *Titanic.* The efforts of radio operators Jack Phillips and Harold Bride were widely reported. Phillips was rescued but died shortly after, while Harold Bride, the junior operator, survived.

The sinking of the *Titanic* was perhaps the single important event highlighting the need for training and certifying of radio operators. Harold Bride's personal experience as junior operator on the *Titanic* as she was sinking was reported in the *New York Times*. One of the ships that came to the rescue of the Titanic was the *Chester*, and Bride described the radiomen on board the *Chester* as "wretched operators. They knew American Morse but not Continental Morse sufficiently to be worthwhile…. The *Chester*'s man thought he knew it, but he was as slow as Christmas coming…. If the *Chester* had had a decent operator I could have worked with him longer…."[4]

In Canada, the life of radio operators at sea and on shore stations was popularized in the works of the author Thomas Raddell. Despite the low pay and often horrific working conditions, Raddell captured the appeal of adventure and travel opportunities for radio operators on board ship. Like most operators, he had to be satisfied with a second officer position, since only someone with a First-Class Certificate could be the senior, or sometimes sole, operator on a ship.

Certification of Radio Operators

There were several radiotelegraph conferences held in the early decades of the 1900s. These international conferences established the regulations governing various aspects of the use of radio or wireless. In Canada the results of these conferences were codified in domestic legislation known first as "The Wireless Telegraphy Act (1905)" and later as "The Radio Act," the term that will be used here.

A number of international conferences, starting with the International

Radio Telegraph Convention of Berlin of 1906, set out the requirements for radio operators and the regulations for the use of radio on board ships. The regulation mandating the certification of radio operators is contained in the Service Regulations affixed to the Berlin Convention in Part VI, and reads: "3. The service of the station on shipboard shall be carried on by a radio operator holding a certificate issued by the government to which the vessel is subject."

The Berlin conference established regulations increasing operators' watchkeeping hours at sea and requiring larger vessels to maintain a continuous watch. Further, the 1906 conference established the use of 500 kHz for maritime land stations and 1.0 MHz for shipboard stations. While the use of two frequencies was beneficial from a traffic standpoint, the downside was that ships listening on 500 kHz would not hear other ships transmitting on 1.0 MHz, so they would not necessarily be aware of other ships in distress nearby. The 1912 London Conference established 500 kHz as the international maritime calling and distress frequency for both land and ship stations. Contacts were to be initiated on 500 kHz but moved to adjacent frequencies if more than a few seconds long, unless they were emergency calls. The format for signalling an emergency—twelve, four second dashes—was standardized in the 1927 Safety of Life at Sea (SOLAS) regulations. These were annexed to the 1927 International Radio Telegraphic Convention Recommendations, which also made the installation of radio equipment obligatory on certain categories of ship. The Telecommunication Conference (Madrid, 1932), Para 21, Article 22 of the General Radio Regulations, specified the technical requirements for the Auto-Alarm. The Operating Instructions for the Model AR-8600 Auto-Alarm, issued by the Radio Division of the Department of Transport in April 1937, state: "The international auto-alarm signal consists of a series of dashes four seconds in length, separated by spaces having a duration of one second. Twelve such dashes and spaces can be transmitted in one minute. Auto alarms designed to meet the requirements of the Federal Communications Commission are arranged to actuate warning bells when three correct dashes and spaces have been received."

The requirements and regulations mentioned above were codified in the *Handbook for Wireless Telegraph Operators* issued by the Postmaster General of Great Britain. Known as the "PMG," it became the basis for radio operator training and examination in Canada into the 1960s.

Larry Reid, in his *Story of the West Coast Radio Service*,[5] notes that the Canadian government was slow in administering the radio operator certification provisions of the Radio Act of 1913. He writes: "The U.S. had created their Department of Communication (predecessor to the FCC) in 1912 and by 1913 had Radio Inspectors located in most major cities who were conducting radio operator examinations and issuing certificates."[6] At that time there were no nationality restrictions for U.S. operator certification, so many

Canadians went south and wrote the U.S. exams." Many operators were ex-British Post Office telegraphers who had immigrated to British Columbia. There were often family connections. Alfred "Chil" Flick, (1915–1983), who recruited the author as a radio operator in 1955, came from such a family. His father, Henry Flick (1891–1947), had been a Marconi operator at sea as a young man and had personally trained some 2,000 operators for sea service. During WWI Henry Flick had trained 200 men of the Royal Flying Corps on aircraft wireless equipment (see Fig. 1). In the post-war period he ran the Provincial Wireless Colleges, Limited, before immigrating to Canada with his family in 1926. His two sons, Chil and Joffrey, followed his career path, both becoming operators with the Department of Transport. Chil later became Superintendent of Radio Operations in the Ontario Region, and Joffrey (1917–1953) served with distinction in WWII, but sadly died tragically at sea postwar.[7]

There were several international radio or radiotelegraph conferences in the first three decades of the 1900s that set the parameters for radio operator duties. The 1927 International Radiotelegraph Conference (Washington) was important because it dealt with the demise of spark and other substantive radio matters. The

Fig. 1. Henry Flick with his Royal Flying Corps class in WWI, 1915. (Ryan Flick family)

acts of the conference were signed on November 25, 1927, and the provisions of the conference became effective on January 1, 1929—just when Jas C. Wilson was setting up RCC in Toronto. Prior to the 1927 conference, the examination for radio operators was established around a set of examination questions known as "Technical Papers," which had evolved from a 1916 set of papers. There were at least 18 of these papers, each containing seven questions. The aim of the certification of radio operators was to equip them with the knowledge to quickly resolve a problem, particularly during an emergency, when the operator was most likely alone. The following are examples of the questions for the Coast Station part of the exam:

- If your aerial is too long to receive short wavelengths, how would you proceed to adapt it to short wavelength without shortening the aerial? (Paper 2, #7);
- Assuming the set running normally, you found that there was no spark on pressing the transmitting key. In what order would you go over the circuits, describing the remedy for each possible fault you mention? (Paper 3, #4);
- Why are guard lamps or carbon resistance rods used across machines? (Paper 7, #6);
- Describe fully the procedure followed on your station in changing the transmitting wavelength from 600 to 1600 metres. Show in dotted lines, on the diagram provided, the changes that would have to be made in the connections. (Paper 8, #7);
- How would you calibrate with a wavemeter
  - (a) the primary of a two-circuit receiver
  - (b) the secondary of a two-circuit receiver? (Paper 13, #5);
- (a) Why are high resistance telephones not wound with resistance wire and
- (b) how would you test your telephones if you suspected that they were injured? (Paper 17, #5).[8]

By 1923 there were at least five direction finding (D/F) stations in Canada, known as Radio Compass Stations in the United States (see Fig. 2 for a typical D/F unit).[9] The Canadian stations made

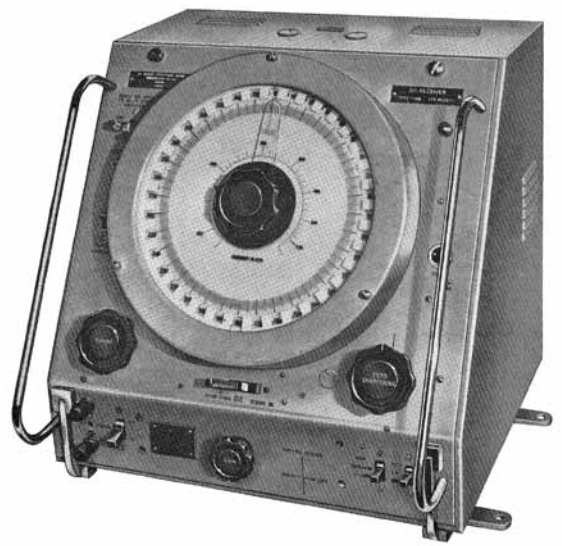


Fig. 2. The Lodestone III Direction Finding (D/F) Set, Type 758E. (Marconi Marine UK)

their initial contact with a ship desiring a bearing to be taken from the ship's transmission on 600 meters (500 kHz). They then shifted and took the bearings on 800 meters (375 kHz).[10] After hearing evidence from the radio operator of *S.S. Cairnmona*, a 1924 report on the investigation of the stranding of this ship recommended that "…knowledge of these instruments….be included in future examinations." And so a requirement to know D/F was then added to the R.O. knowledge base. The early "spark" certificates lasted until 1928, but in the following year, anyone who had obtained his certificate in 1928 or before had to be examined again for the new continuous wave (CW) certificates.

Ed Davey, writing of his experiences with the radio branch beginning in 1924, mentions the expeditions in the Hudson Strait of 1927–28. Shortwave CW stations were set up in the strait, and communications were established with station VAA, which operated a 4 kW station in space leased from a wholesale grocery firm on Wellington Street in Ottawa. Library and Archives Canada, a federal institution tasked with acquiring, preserving, and making Canada's documentary heritage accessible, now occupies the space.[11] This organization is the source for much of this article.

The actual examination of radio operator candidates was carried out by Radio Inspectors of the Department of Marine and Fisheries. The implications of the 1927 Conference were expected to affect the work of the inspectors, and in October 1928 they held their first conference in Ottawa to discuss, among other things, the examination requirements. One of the motivations for holding this conference was likely the 50 percent failure rate for operators taking the D/F examination in 1926.[12]

Radio communications literature into the early 1930s reveals a strong faith in the potential of the new wireless technologies. Writing in 1930, A. N. Fraser, Chief Engineer of the Radio Branch, Department of Marine, notes that the government had embarked on a program to replace all sparks sets in its stations. As a result, all except one or two isolated posts were operating on continuous wave by 1930. Fraser pointed out that their first station on Belle Island had cost $5,000 and had a range of about 50 miles. The new CW station at Vancouver would cost $100,000 and could take care of traffic from ships as soon as they had left Sydney, Australia, or Singapore. His closing remarks capture the spirit of the time: "…radio…intelligently employed,…may become one of the most potent factors in bringing about mutual understanding among all peoples, and the promotion of an irresistible sentiment in favour of universal peace."[13] It was an inspiring forecast for Jas C. Wilson as he began to establish the Radio College of Canada.

Predecessors of RCC

Thomas Raddell, mentioned earlier, was a Marconi operator. The Marconi Wireless Telegraph Co. of Canada Limited had schools at Toronto and Montreal (11 St. Sacrement Street—the company's Head Office). The history of the Canadian Marconi Company and its contracts

with the government of Canada is well documented and beyond the scope of this article. As mentioned already, the company had established a school of instruction for their operators in Montreal in 1915 under the direct control of the company. Even though the company ran its own schools, their operators still had to be examined and certified by government inspectors. Thus, we find correspondence from the Canadian Marconi Company's Great Lakes Division office at 1 Adelaide Street, Toronto, requesting forty copies of forms to be filled in for permission to attend examinations held by the government for radio station licences. Their letterhead includes the statement "Operating Canadian Shore Stations from Port Arthur to the Atlantic: For Reaching Ships at Sea."[14]

When RCC was established in 1928, it incorporated as a company operating in the Province of Ontario. There were already several radio schools giving training in preparation for the Second-Class Certificate of Proficiency in Radio. The following are examples:

- Sprott Shaw schools in Vancouver and Victoria (giving courses leading to operator certification since around 1915);
- Dominion Telegraph and Wireless Institute, Vancouver, 1916;
- Superior Schools, Victoria, 1917;
- Dominion School of Telegraphy and Railroading, President J. E. Cassan, Toronto (located at Yonge and Grenville streets), 1918.

Correspondence between the Department of Marine and radio schools reveals difficulties facing both the schools and their students in the early days. These and other problems provided an opportunity for entrepreneur Jas C. Wilson to create a reliable educational program for radiomen. The Dominion Telegraph and Wireless Institute, commenting on recent changes to the Canadian Radio Act, pointed out that several of their students were below the new age 18 requirement. One student, who had just turned 17 years of age, had been an evening class student for some nine months. The institute asked that exceptions be granted to these students.

Superior Schools wrote concerning the calculation of charges, as they had been given inconsistent rulings from different officials. They also noted that their instruction included the Postmaster General's Handbook, and they wondered if candidates would now be required to study the Radio Telegraph Act. Further, they complained that the examinations were not clear on the differences between the American and domestic word counts. Dominion School of Telegraphy and Railroading sought clarification on the speed requirements for the examination in Proficiency in Radiotelegraphy.

Finally, J. M. Colton, a radio inspector with the Marine and Fisheries Department in Montreal, wrote to the director of the Radiotelegraph Service asking for a synopsis of the marks obtained by a Mr. John Brady on part of the examination for Proficiency on Radiotelegraphy. Mr. Brady had never attended a Canadian school and had acquired his knowledge of landline procedure from the 1921 Canadian National Tariff Book, a document described as

"vague and contradictory." The letter stated that there was no radio school operating in Montreal, which perhaps might have been better worded as "other than the Marconi School."

With a few exceptions, the major impetus to retrain radio operators was the demise of spark wireless telegraphy. The demise of spark telegraphy was agreed to by signatories to the International Radiotelegraph Convention held in Washington in 1927. The convention document stated: "The use of spark (Type B waves) of a frequency below 375 kc/s is forbidden as from 1st January 1930 except as regards existing land stations. No new installations of the emission of Type B wave shall be fitted in ships or in aircraft as from 1st January 1930. With some exceptions the use of Type B waves of all frequencies shall be forbidden as from the 1st January 1940." Vacuum tubes became the chosen technology, with one notable exception—the quenched spark gap, which in one form or another served special emergencies at sea into the 1940s. A technical description of the quenched gap appears in the Admiralty Handbook of Wireless Telegraphy (1938)—the bible of radio operating knowledge. In fact, Volume 2 of the 1938 handbook contains an extensive chapter, "The Spark Transmitter," which is the first item in the book, along with a set of examination questions and instructions for tuning emergency spark attachments.

The Early Years of RCC 1928–38

Jas C. Wilson, founder and first president of RCC, had come to Canada from the United States in April 1914 at age 22.[15] He was a U.S. citizen, born in Michigan. As an adding machine inspector in possession of $70 worth of effects, he was said to be "assured work" on arrival in Canada. By 1927 he was a salesman for Stewart Warner Speedometer Corp. in Toronto.[16] Coming from the radio receiver industry, it seems unlikely that the training of radio operators was a factor in his initial decision to establish RCC in Toronto in 1928.

With the burgeoning market for radio receivers at the time, Wilson would have been aware of the need for radio servicemen and the documentation of radio sets. In 1928 he began the Individual Circuit Service in the form of data sheets, which later became the RCC Service Manuals. Data sheet 1 contained a few circuits for Silver Marshall, Temple and others, but by Data Sheet 3, the number of radio circuits had increased dramatically. Among them were seven circuits for Stewart Warner models from 1925–28.[17] These early data sheets seem to have been willingly provided by the manufacturers because these pages are marked "Courtesy Stewart Warner Speedometer Corp," and similar credits are shown well into the 1930s.

From the beginning, Wilson seems to have gone out of his way to cooperate with the radio industry. In August 1930 RCC was earmarked to examine and grade radio servicemen under a Rogers-Majestic plan for registering radio servicemen throughout Canada. By December 1930 RCC had allied with Rogers-Majestic to form the Radio Servicemen's Association of Canada (RSA).

Radio servicemen who had passed a practical examination would join the association and were permitted to wear an RSA badge.[18]

The publication of the data sheets seems to have been the reason for establishing RCC, which was located in a small building at 310½ Yonge Street in 1928. This building was also occupied by the Albion Social Club and the Durham H. Bertram Dancing School, which gave the impression that RCC occupied not much more than an office. The Toronto City Directory for 1930 shows the management of RCC as Jas C. Wilson, President; Ralph S. Mills, Vice President; and Marjory Evan as Secretary–Treasurer. By 1931 Wilson was listed as President and Manager, and around 1933, perhaps recognizing the demand for radio operators and technicians, Wilson moved the RCC to its long-time quarters at 863 Bay Street, Toronto.

On March 22, 1930, shortly after Wilson had established RCC, the Radio Training Association of America, Limited, of Chicago (RTA), through their Toronto solicitor, Abraham Singer, made application for incorporation to the government of Canada. Singer had researched company names and found a listing dated December 19, 1929, for Radio College of Canada, an Ontario company. In the presentation of his case, Singer stated that the objects of RCC were very much the same as the Radio Training Association of America (Canada) Limited which, he says, were:

- To teach and instruct persons in the theory and practice of radio engineering, broadcasting and receiving, and in similar subjects connected with the radio industry;
- To manufacture, assemble, repair, adjust, buy, sell, exchange or otherwise deal with radio sets, materials, fixtures and parts, and generally to carry on the business of radio instructors, manufacturers and repairers; and
- To apply for, purchase, acquire and hold or otherwise secure patents and or licenses of any kind, and to use, exercise, develop or otherwise deal with the rights and property so acquired.

Singer went on to say that RTA, like RCC, intended to teach and instruct persons in the theory and practice of radio. His argument was accepted by the authorities, and Letters of Patent incorporating the company were recorded on May 30, 1930.[19] While no description of the objects of the original RCC has been found, Singer's set of objects is close enough for the purposes of this article.

By publishing the service manuals, Wilson clearly had established a good relationship with the industry, and was no doubt party to a decision of the Canadian Radio Manufacturers Association to set up a service committee "to deal with the examining and rating of service men employed by dealers throughout Canada." On January 25, 1932, R. A. Hackbusch, chairman of the committee, wrote to the Director of Radio, Commander C. P. Edwards,[20] proposing that the Radio Branch take over the handling of examinations of service men "in a manner similar to that now in use throughout the Dominion

for examining [radio] operators." Commander Edwards, then the most senior radio official in the country, clearly liked the idea, but he sought legal advice to determine whether his department was authorized to "compel all radio service men to submit to an examination as to their qualifications, and to authorize the issue of certificates of proficiency." Sadly, the Deputy Minister of Justice bluntly rejected the idea, saying that he did "not observe any provision of the statute which….could be safely relied upon to justify such a project, either upon a compulsory or voluntary basis."[21]

One wonders if the rejection of the proposal to certify serviceman led Wilson to become aware of the need to retrain existing Canadian radio operators and to train a new generation of operators for the vacuum tube era. Perhaps Commander Edwards wanted to avoid the problems outlined earlier and encouraged Jas C. Wilson to set up a new radio operator program. In any event, the strong collaboration between RCC and the licensing authority began at this time and lasted for decades. Evidence of this growing interest in radio communications began around 1933 with the arrival of Frank B. Hobbs as manager or superintendent. Hobbs, a "radio engineer," had arrived in Canada from Auckland, New Zealand, via the United States on May 5, 1930, at age 27, and had become a salesman for Majestic Radio in Toronto. He was to be the major force for the RCC radio operator program well into the 1960s.

Starting around 1934, Radio College was granted a federal technical or training school station radio licence with the call sign VE6AF. There were strict limitations under this category of licence. The licensed apparatus was to be used "solely for the purpose of instruction in radio and for no other purpose whatsoever." The Radio Act specifically stated that "Except in special circumstances and unless otherwise authorized in the licence, the use of an artificial or dummy antenna system only is permitted." Similar licences had been granted to the Marconi Schools and other radio educational entities, and were no doubt intended to allow radio operator trainees first-hand experience listening to the radio chatter from radio-equipped ships around the world. As a condition of licence at least one of the school's instructors had to hold a Canadian First-Class Radiotelegraph Operator's Certificate of Proficiency in Radio. Mr. Hobbs no doubt acted in this capacity. Hobbs had been an amateur radio enthusiast in New Zealand with the call sign ZL1AR and now, in the 1930s, he had registered an amateur station VE3AAX at the college and also held two Canadian licences of his own (VE3XH and VE3WR).

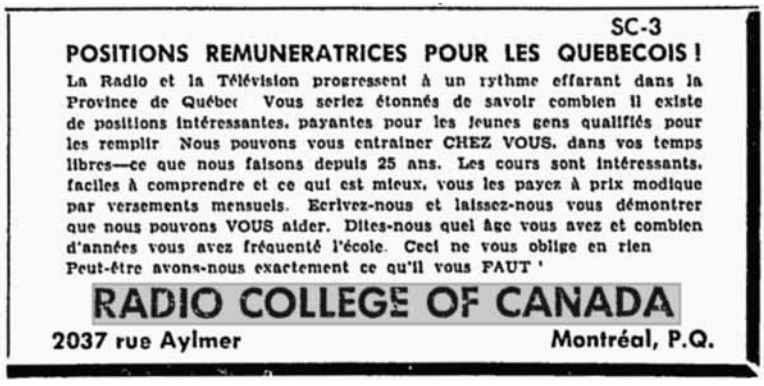
In the list of the three objectives of Radio College above (drawn from those of the Radio Training Association of America), the third objective does not cover teaching or instruction but rather patents and or licenses, which is beyond the scope of this article. However, two brief examples show that this was a continuing concern of the owners and managers of the college. In 1935, RCC advertised in the *Radio Amateur Call Book Magazine* as being representatives for Canada for the Instructograph

Company of Chicago, which manufactured an "Automatic Code Teacher." An applicant for enrollment with RCC in 1940 could rent one of these automatic code teachers for $10.00. Another example from 1959 shows R. Christopher Dobson, then president of RCC, registering shares of Teleflex Limited, a company primarily engaged in the design, manufacture, and sale of remote controls.[22] No doubt these initiatives contributed to the overall financial stability of the College.

Advertising

The most visible historical record of RCC is through their thousands of advertisements in radio publications and national and local newspapers. Two examples of advertisements that RCC placed in newspapers, the technical press, and amateur radio publications are reproduced in Figs. 3 and 4, one in English and one in French. The college sometimes shared a booth with other parties at exhibitions such as the Canadian National

Fig. 3. Advertisement for RCC. (Tom Brent, SPARC Museum, Coquitlam, B.C.)


SC-3

POSITIONS REMUNERATRICES POUR LES QUEBECOIS !

La Radio et la Télévision progressent à un rythme effarant dans la Province de Québec Vous seriez étonnés de savoir combien il existe de positions intéressantes, payantes pour les jeunes gens qualifiés pour les remplir Nous pouvons vous entraîner CHEZ VOUS, dans vos temps libres—ce que nous faisons depuis 25 ans. Les cours sont intéressants, faciles à comprendre et ce qui est mieux, vous les payez à prix modique par versements mensuels. Ecrivez-nous et laissez-nous vous démontrer que nous pouvons VOUS aider. Dites-nous quel âge vous avez et combien d'années vous avez fréquenté l'école. Ceci ne vous oblige en rien Peut-être avons-nous exactement ce qu'il vous FAUT !

RADIO COLLEGE OF CANADA

2037 rue Aylmer Montréal, P.Q.

Fig. 4. RCC advertisement, Montreal. (Les Chutes, Oct. 20, 1954)

Exhibition of 1935 where they are shown as "British American Extension College, Incorporating Radio College of Canada—Educational Courses."[23] RCC also advertised itself as an authorized agent for the Sprott-Shaw School in Vancouver.

RCC in WWII

By 1938 RCC had become well established, with successful technical and radio operator courses and a publishing arm issuing the well respected RCC Service Manuals. The radio operator course, if attended full time, could be completed in eight months. However, as students had to pay their own tuition fees, and the living cost for out of town students was expensive, two alternative options were offered: evening classes and correspondence courses. Evening classes, which could take up to two years to complete, were an attractive option for local students, as they could continue to earn a living wage while studying. Correspondence courses, which allowed students to study at their own pace, were attractive to out-of-town students, as they would not then have to face the high costs of living in Toronto. These arrangements worked well in the last years of the 1930s, but the onset of war in 1939 created new challenges for the college. The demand for radio operators, crucial to the war effort, increased dramatically, and staff members left to join the armed forces.

The pressure on Radio College to quickly produce qualified operators for the war effort was complicated by many factors. One example, which might have reduced the number of incoming students, was an amendment to the RCC application form stating the student "Must be a British subject and…not eligible to take commercial operating examinations if he or his parents have at any time been enemy subjects." In the 1940s, the British Merchant Navy dominated the North Atlantic trade routes, and Dutch and Norwegian ships, unable to return to their home ports, joined that mix, with all their officers being fluent in English. They needed a second radio operator on board to sail in convoys, and as their radio operators adhered to the PMG guide for operating procedures, RCC was a good source of operators for these ships.[24]

The demand for operators was so high that a former RCC instructor, with the tacit approval of RCC, set up the Canadian Electronics Institute (CEI) in Toronto to train a backlog of operators. The well-known electronics educator, the late Ernie Brown, graduated from CEI, and as a radio operator in the merchant marine, he sailed in the Atlantic convoys. These were highly risky ventures—Brown was torpedoed twice in the early stages of the war. The Canadian Electronics Institute was short-lived, as its chief instructor was soon called for military training.

RCC began training women operators around 1942; the first graduating class is shown in Fig. 5.[25] Even with the number of women operators graduating, war conditions had created a demand for radio operators which could not be filled by graduates from radio training schools in Canada. By 1943 some 770 radio operators were employed in the Department of Transport at marine

Fig. 5. First women's RCC Radio Operator class, 1942. (YLRADIO website)

stations, airports, and monitoring stations in Canada and Newfoundland. Canadian Radio operators provided services essential to the war effort of Naval Service Intelligence, the Royal Air Force Ferry Command, the United States Ferry Command, the Combined Training Organization, the Royal Canadian Air Force, and Trans-Canada Air Lines. Further, the merchant navy with its radio operators was regarded as "practically an arm of the fighting services." The Department of National War Services had recognized these radio services as being essential to the prosecution of the war, and as of March 1943 they were short 275 operators.[26] Finally, in a country at war, the duties of operators at marine, air and monitoring stations required a higher level of secrecy. In the case of the monitoring stations the need to intercept enemy transmission required a knowledge of "foreign" Morse code.

The demand for operators was mainly by the Radio Division of the Department of Transport (DOT) and the Merchant Navy for "foreign-going" merchant ships. As a result, DOT sent a letter to thirteen radio training schools announcing a program of financial assistance for students who agreed to accept employment with either of these two entities. The letter was co-signed by the controller of radio for DOT and by the director of merchant seamen.

Applicants for the DOT program had to attend regular daytime classes but would only be refunded one-half of their tuition fees after completing six months of satisfactory service with the department. Male operators were required to take duty at any departmental station in the Dominion of Canada. Female operators were to be employed at departmental monitoring stations as much as possible. As will be seen below, separate policies for male and female operators soon broke down as the demands for operators increased.

Applicants intending to serve on foreign-going merchant ships would be paid $60.00 per month during a basic training period of eight months, and would be refunded the full tuition fees in two parts. One-half of the fees would be refunded when the student entered the

merchant seaman's manning pool, and the other half after one year's satisfactory service. The program was only open to male students, who were then obliged to serve for two years on any foreign-going ship to which they were assigned.[27]

The restrictive opportunities for women operators are related in Olive Carroll's book "Deep Sea Sparks." She writes "Canadian restrictions forbade women to serve aboard our country's ships but Norway had no such reservations." Several women sailed as "sparks" in the merchant marine. Following the lead of the first, Fern Blodgett, eight sailed in wartime, and others, including Olive Carroll, in the years that followed. During the war years many women RCC graduates went to work in the intercept or monitoring service and later at the radio range stations.

The Curriculum

Two basic documents, both British in origin, set the stage for radio operator training in Canada. While there were many publications and reprints of the two documents, those issued in 1938 provide the best point in the timeline to describe the radio operator curriculum. The *Handbook for Wireless Operators Working Installations Licensed by His Majesty's Postmaster-General* is "a manual for the guidance of wireless operators on board ship and at coast stations with regard to the acceptance and treatment of radio-telegrams, the transmission and receipt of signals, and other details of actual working."[28] This document does not deal with the scientific principles of radiotelegraphy or the details of apparatus; these matters were covered in the *Admiralty Handbook of Wireless Telegraphy*.

The *Admiralty Handbook of Wireless Telegraphy* was issued "for the information and guidance of Officers and Men of H. M. Fleet" and was prepared at H. M. Signal School. It was a basic text book for Canadian radio operators who, when the handbook was issued in 1924, were still regulated by the Canadian Navy (Department of Marine and Fisheries). The 1931 version of the handbook ran to 1032 pages. From 1924 to 1938 the handbooks were revised and updated several times to reflect changes in technology and operating practice.

While RCC undoubtedly used the handbook as a primary reference, they had produced their own course material from the beginning. The May 1934 issue of *Radio Craft* contains an advertisement for RCC, then at 863 Bay Street, saying "The Engineering Course is written by Mr. Florian J. Fox, B.Sc. (Yale) Chief Technical Adviser to the RCC. Mr. Fox is well known throughout America.… at present he is Engineer in charge of design for the Rogers-Majestic Corp, Toronto…"[29] It seems likely that Fox's course material was intended for the education of radio technicians, but much of the theory part of the course would have been equally applicable for the new radio operator program that year. The RCC material would have been tailored to specific course requirements (e.g., radio operator, technologist/technician), with each student being given a binder containing the information needed to pass their examinations. The binder cover

used for RCC materials for decades is shown in Fig. 6.

In 1942, J. E. Kitchin, a well-known radio inspector with the Radio Division of the Department of Transport in Ottawa, published the *Traffic Handbook for Radio Operators*. Produced for students preparing for the Canadian examinations for Certificates of Proficiency in Radio, it was approved by the Radio Division for use in radio schools and colleges. It was based on the International Telegraph Regulations and Radiocommunication Regulations, Cairo, 1938.

The aim of the radio operator courses was to prepare students to meet the requirements for the Second-Class Certificate of Proficiency. The course followed the syllabus of the Postmaster General's Handbook (PMG). When the author officially received his "ticket" on August, 5, 1959, the cover letter itemized the syllabus along with the marks obtained in the various subjects. This, then, was the end goal of the curriculum:

Section (1) – Sending
- (a) Plain language
- (b) Code groups

Section (2) – Receiving
- (a) Plain language
- (b) Code groups

Section (3) – Practical
- (a) Main and Emergency Transmitters
- (b) Main Receiver
- (c) Emergency Receiver
- (d) Direction Finder
- (e) Auto-Alarm
- (f) Automatic Sender Unit
- (g) Lifeboat Equipment

Section (4) – Traffic
- Operating Procedure
- Computation of Tolls

Section (5) – Technical Theory

Section (6) – Diagrams

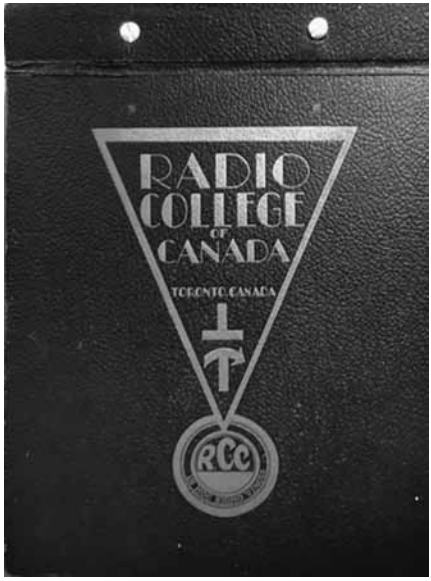


Fig. 6. Cover page of the lessons binder. (Author's collection)

While there was some latitude in the curriculum, including re-examination in the case of failure in one part of the exams, there was little flexibility in the RCC course in 1959 where the auto-alarm, a ship's last resort in case of trouble, was concerned. As mentioned earlier, the auto-alarm (see Fig. 7) responded to three 4-second dashes on 500 kHz by ringing bells on the bridge and at the radio operator's bunk. Graduates had to

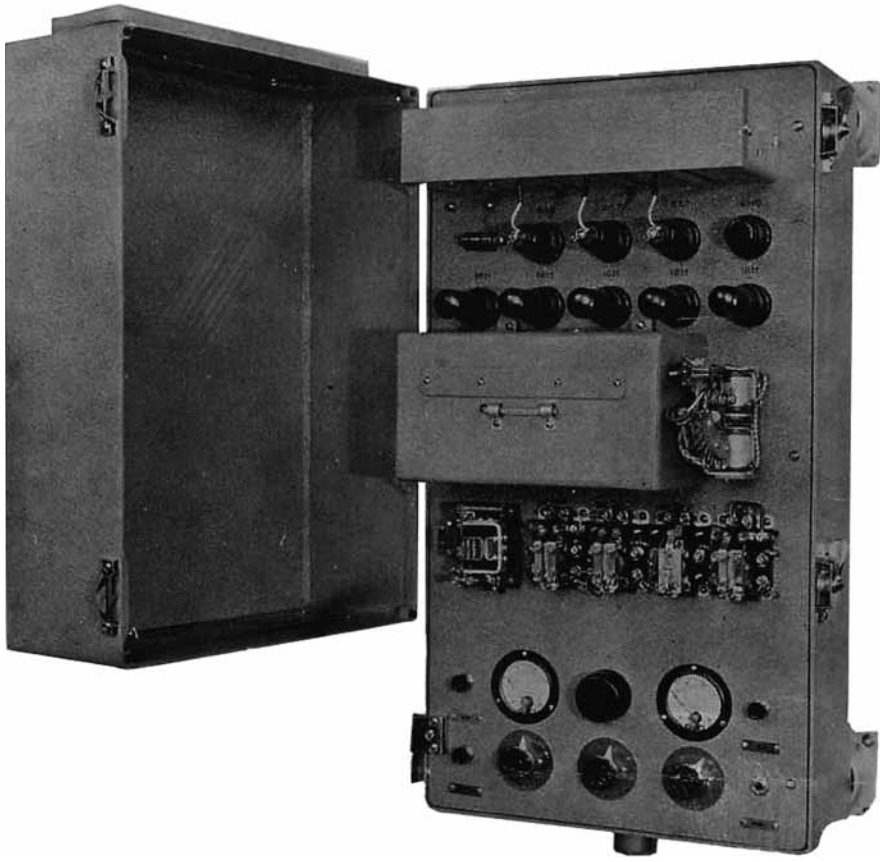
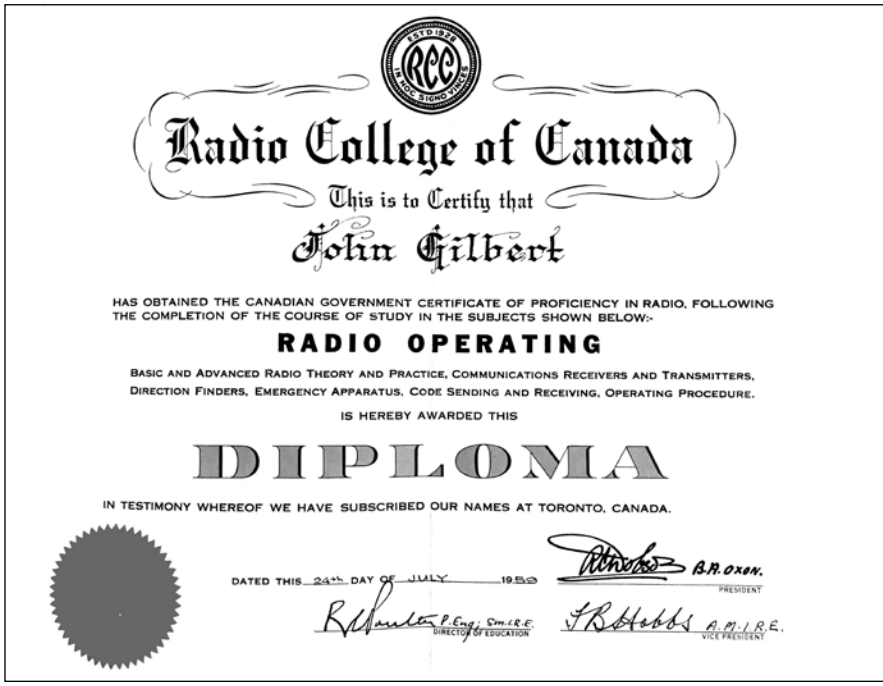


Fig. 7. Auto-Alarm AR-8600, Radiomarine Corp of America. (Laval Desbiens collection)

know all the relay sequences and be able to effect repairs. The Automatic Sender Unit was, I believe, known as the auto-call, and was a battery-operated device activated when thrown into the sea. Training on the auto-alarm was given a high priority. Alice Carroll tells of her experience with the auto-alarm, which was "temperamental and [acted] up."[30] Days were spent on the RO course in message handling, the counting of words, and tariff calculations. In addition to the Second-Class Certificate, graduates received a diploma from the college such as the one shown in Fig. 8, which is the one this author received on July 24, 1959.

As an interesting comment on the long delay in introducing new technologies, ex-radio operator Silas Tucker recalls servicing the auto-alarm equipment while at the radio school in 1952, where he learned how to clean and adjust a quenched spark gap transmitter and practice sending the twelve 4-second dashes.[31] The author had worked for two years as a "Radio Operator Learner" prior to attending RCC in 1958.[32] Ted Stroud, the Morse code instructor, gave


Radio College of Canada

This is to Certify that

John Gilbert

HAS OBTAINED THE CANADIAN GOVERNMENT CERTIFICATE OF PROFICIENCY IN RADIO, FOLLOWING THE COMPLETION OF THE COURSE OF STUDY IN THE SUBJECTS SHOWN BELOW:-

RADIO OPERATING

BASIC AND ADVANCED RADIO THEORY AND PRACTICE, COMMUNICATIONS RECEIVERS AND TRANSMITTERS, DIRECTION FINDERS, EMERGENCY APPARATUS, CODE SENDING AND RECEIVING, OPERATING PROCEDURE.

IS HEREBY AWARDED THIS

DIPLOMA

IN TESTIMONY WHEREOF WE HAVE SUBSCRIBED OUR NAMES AT TORONTO, CANADA.

DATED THIS 24th DAY OF JULY 1950

B.R. Oxon. PRESIDENT

R. Moulton P.Eng., Sm.I.R.E. DIRECTOR OF EDUCATION

J.B. Hobbs A.M.I.R.E. VICE PRESIDENT

Fig. 8. Radio College of Canada Diploma. (Author's collection)

the author a choice: Take the Morse classes starting at the beginning, or be the instructor. The instructor role was chosen, and Ted got some time to catch up on his paper work. The author is shown sending Morse code to the RCC class in Fig. 9.

Most of the candidates studying to be radio operators at RCC would have aimed at the Second-Class Certificate of Proficiency.[33] Kitchin summarized the requirements as follows:

- Code Tests: International Morse code in plain language at 20 words per minute and code groups at 16 words per minute;
- Practical: Oral questions on the adjustment, operation and maintenance of equipment;
- Traffic: One paper on the handling of radio messages and one on counting and charging for radiotelegrams and counting landline telegrams;
- Technical: One paper on elementary electricity and magnetism, the principles of radio, and the maintenance of CW, ICW and radiotelephone transmitters, emergency equipment, direction finds, auto alarms, frequency meters, etc;
- Diagrams: Diagram of a circuit in each of the transmitter, vacuum tube receiver, emergency transmitter, direction finder, and auto alarm. "The internal wiring of parts must be shown and the various parts must be named."

Fig. 9. John Gilbert sending code to the class, 1958. (Author's collection)

Practical work on real equipment was performed at the college's radio lab on King Street in the 1950s. The Marconi transmitter, Reliance, was chosen for classroom instruction because it was typical of marine installations at the time (see Fig. 10).[34] The equipment in the lab was fitted to mirror an actual shipboard installation. Fault-finding was a critical part of the instruction, and in the final examination, students were required to repair a piece of equipment. See for example the woman pictured with the Lodestone D/F unit shown in Fig. 11. Students were also expected to be able to draw the complete schematic of the transmitter and to understand the purpose of each component.

Radio College was not the only training school for operators. Others such as the Manitoba Technical Institute (MTI) in Winnipeg and the Vocational Training Center in St. John's, NL, graduated many radio operators in the 1950s to meet the growing need for operators in the Arctic. Operators were in demand to work on the Distant Early Warning (DEW) line, and DOT was severely short of operators as a result.

Radio operators who accepted employment with the government of Canada also received training in weather observing. This prepared them for service at isolated stations and many airports, where the radio operators observed and recorded the weather data. The operator would send the weather reports by CW or radioteletype to a control station, and from there they were sent to the Canadian Aviation Forecast Office

Fig. 10. The Marconi transmitter installed on the on the Reliance was used for classroom instruction. (Jerry Proc collection)

in Montreal. On radio range stations, the operator would also broadcast the weather report for use by aircraft pilots. Most radio operators, whether at sea or on shore, were engaged in shift work, but there were also several reasons for additional duty. In smaller stations, the radio operator would be the only person who remained in touch with the "outside world" via the radio station, and would be the person on the station who provided "home base" around the clock. In addition to radio communications and weather observations, operators were required to perform an assorted list of

Fig. 11. Ursula Kyaw fixing the Lodestone D/F Unit, c. 1958. (Author's collection)

"other related duties." One example of these on the most isolated stations was "fire watch," which required the operator to walk around the station looking for evidence of fire on days when the wind exceeded a certain speed.[35]

By 1961 the Department of Transport had begun training its own radio operators at the Air Services Training School in Ottawa, teaching marine and aviation communications procedures and basic meteorology associated with aviation and weather.

People, Places and the Legal Basis

As mentioned earlier, Jas C. Wilson was the founder and first president of RCC in 1928. His vice president was Ralph Shaw Mills (1903–2002), who had recently graduated from law school in 1928. No doubt Mills assisted Wilson with the legal aspects of the college, and he went on to follow a career with a prestigious law firm in Toronto. When R. Christopher

Dobson became president of the college around 1936, Frank Hobbs became vice president. These two were the principals of the college until the post-war years, when R. C. Poulter became president. The college had quickly outgrown its first home on Yonge Street and was located for many years at 863 Bay Street before moving to 54 Bloor Street and then to 86 Bathurst Street in the late 1940s. As far as the radio operator courses were concerned, their last move was to 461 King Street (see Fig. 12). The Montreal branch of the college was established at 2037 rue Aylmer in the 1940s and later moved to 3454 rue St. Denis.

From the mid-1930s, Frank Hobbs taught the radio operator course with several assistants as the demand for operators in the war years accelerated. Some of the instructors did not stay long, as they were called to serve in Canada's armed forces. Andrew Kufluk (1920–66), for example, was an instructor of electronics at RCC 1938–39 and then served with the Royal Canadian Air Force. He later joined Ryerson Polytechnical Institute, where he was instructor in radio television arts.[36] By 1942 C. P. Edwards, then the deputy minister and senior official with the Department of Transport, noted that three RCC instructors had also been called for military training. Others were to follow, creating a serious problem for the college, which was committed to graduating large numbers of operators.[37]

Fig. 12. The Radio School located at 461 King Street, c. 1965. (Yorkville University Collection)

The teaching staff was well qualified, and some, such as H. F. Shoemaker in the 1950s, wrote technical articles and became members of professional bodies such as the IEEE.[38] Ted Stroud, who gave instruction in Morse code, was rumored never to have made a mistake sending or receiving the code (see Fig. 13).

Once RCC started giving courses, they would have been legally required to be licensed as an educational institution by the Province of Ontario, in addition to being licensed to use radio by the Dominion government under the Radio Act. It is unclear if RCC itself was licensed as an educational institute or whether it carried out its business as part of a parent company. In 1935 the company appeared in the Official Souvenir Catalogue and Program of the Canadian National Exhibition in Toronto as offering educational courses with the listing "British American Extension College / Incorporating Radio College of Canada /

Fig. 13. "Ted" Stroud, the Morse code instructor who never made a mistake. (Author's collection)

863 Bay St., Toronto."[39] Jas C. Wilson is shown in the city directory as "President of British American Institute Ltd. and Radio College of Canada." The following year Radio College of Canada is listed at 863 Bay Street, Toronto, with Jas C. Wilson as President and F. B. Hobbs as Superintendent. In 1937 the college was acquired by R. Christopher Dobson, who remained its president well into the 1960s, when he became Chairman of the Board. In 1938, RCC fell under the Ontario Trade Schools Regulation Act, but as part of the Northern Institute of Technology Limited, and this remained in force until at least until 1959, as shown in this manner on the RCC Diploma granted to the author.

Adapting to Changing Times and Technologies: 1947–62

After the hectic war years, including a period where rehabilitation training was a priority, the college settled into a pattern lasting into the 1960s. The establishment of RCC Publications, a Division of Northern Institute of Technology, Ltd., under H. F. Shoemaker, in the early 1950s, put the RCC Service manuals on a firm footing and allowed for efficient printing of course materials for the technician, technologist, and radio operator programs. The reputation of the college had been built in part on the service manuals, which became increasingly sophisticated over the years. The manuals covered radios from 29 manufacturers in

the early 1930s, and the products of other manufacturers were added annually, with companies such as De Forest and Crosley represented by some thirty models. By the 1960s, the TV service manuals contained circuit diagrams, alignment instructions, waveform patterns and analyses, lists of test equipment, and test equipment connections. The cover of the RCC Master Index listing all these sets is shown in Fig. 14.

Postscript

The RCC brochures of the 1960s reveal a decreasing radio operator program, coinciding with the declining job opportunities for radio operators worldwide. An RCC brochure in 1964 lists the RO course, but by 1968 it was no longer offered. Many ex-radio operators looked forward to their retirement as an opportunity to go back to sea and "see the world." They

Fig. 14. Cover page of the RCC Master Index, 1974. (Jerry Proc collection)

renewed their certificate of proficiency at each World Radio Conference in accordance with the Radio Act. However, with the widespread adoption of containerization in the early 1960s, the leisurely days of visiting exotic ports while the ship was in harbour were no more. The Safety of Life at Sea (SOLAS) Convention was revised in 1988, and the Global Maritime Distress and Safety System (GMDSS) came into force in February 1992. The basis of this revised convention was "characterized by the fact that distress and safety communications which had so far been performed by people are automated or semiautomated by means of satellite communications and digital technologies." The adventurous days of the ship's radio operator were at an end.[40]

By 1969, RCC offered only electronic technology courses. A student had a choice of two paths: Senior Engineering Technician and Engineering Technologist. The technician courses spanned twelve full calendar months and covered electrical and electronics basics under the following subjects: theory, mathematics, and laboratory, followed by advanced instruction under the same subject headings. Anyone wishing to become a technologist would have to attend for an additional six months of theory. Transistors and vacuum tubes were still being taught in 1969, but that would soon change as solid-state technology started to make large inroads into commercial electronics.

The college adapted to the times with a new curriculum to service digital and microprocessor-based occupations in data communications, mobile communications, and computer technology. During the 1980s and 1990s, the RCC offered courses focused on the fundamentals of leading-edge technology in electronic engineering, and moved to its present facility, a campus on Steeles Avenue West in Vaugn, Ontario. In 2004 RCC Institute of Technology became the first Ontario private college to offer bachelor's degrees. In 2008 RCC acquired the International Academy of Design and Technology, a private college, and the expanded RCC offerings included a Bachelor of Interior Design and the Toronto Film School programs. In 2017 RCC amalgamated with its parent company, Yorkville University, thus creating Yorkville University/Ontario.

Lea Barker, in his foreword to Stephan Dubreuil's *Come Quick, Danger*, remarks that the last Morse code message from the Canadian Coast Guard Radio station at Ketch Harbour, Nova Scotia, was sent on November 19, 1996—the end of an era in which RCC played an important role. The RCC crest or badge is shown in Fig. 15.

Fig. 15. Radio College of Canada patch. (Author's collection)

Endnotes

1. RCC is now RCC Institute of Technology, a division of Yorkville University in Toronto. In 2017 Ms. Erin Hatfield, the University's Associate Director of Communications, wrote a history and brochure on the University from which this information and the postscript of this paper are drawn.
2. The technical advances are well documented in *Early Radio: In Marconi's Footsteps* by Peter R. Jensen (1994). References to the Titanic here are drawn from the same source, particularly the "Press Report of the Surviving Wireless Officer of the Titanic," which is contained in Appendix 7 to Jensen's *Early Radio*. Early Canadian wireless history is covered in books such as Sharon A. Babaian, *Radio Communication in Canada* (1992); Bill McNeil and Morris Wolfe, *The Birth of Radio in Canada* (1982); Robert P. Murray (Editor), *The Early Development of Radio In Canada: 1901–1930*, (2005); and Lloyd Swackhammer, *Radios of Canada*, (2002).
3. M. J. Shepstone, "The Marconi School of Wireless Telegraphy," *Scientific American*, Vol. 86, Feb. 1, 1902, pp. 75–75; Stephan Dubreuil, *Come Quick, Danger* (1998) is a useful source for maritime history, particularly about Eastern Canada. Larry L. Reid, *The Story of the West Coast Radio Service,* (1992) covers the story in Western Canada. Robert P. Murray (long-time editor of the *AWA Review*), *The Early Development of Radio In Canada* (2005), fills in many gaps. A. N. Fraser, "The Development of Radio in Canada," *Engineering Journal*, Vol. 13, April 1930, pp. 265–276; this is an important source as it describes the situation in Canada at the time Radio College of Canada was being established. The full version of the Fraser speech is hard to find. It appears to have been transcribed by optical character recognition, and his name was misspelled and hence not found by an Internet search; https://archive.org/details/transactionsofen13engi/page/264 or http://www.radioalumni.ca/z_radioeng.htm.
4. "Thrilling Story by Titanic's Surviving Wireless Man," *New York Times*, Apr. 19, 1912, pp. 1–2.
5. Larry L. Reid, *The Story of the West Coast Radio Service*, *1906–1956*, (Chameleon Publishing, Vancouver, 1992); Available from the Burnaby Public Library, Burnaby, BC. Also see *An Early History of the West Cost Radio Service*, a slightly abridged version for the website. https://www.roughradio.ca/newspapers/reid/West%20Coast%20Radio%20History.pdf.
6. Radio in the United States was regulated by the Department of Commerce from 1912 until 1926. Control was then given to the Federal Radio Commission, which existed from 1926 until 1934, when the present Federal Communications Commission was established.
7. Thanks to family members Barton and Ryan Flick. Joffrey Flick's story was compiled by Chil Flick and donated to Library and Archives Canada (LAC) where it can be viewed as file MG30-E412 Vol. 1. The topic of family connections in the early days of Canadian wireless is an untold story. Several families made important contributions to Canadian wireless history including the Stunden family in western Canada.
8. LAC RG97 Vol. 85, File 6191-5 (R1203-17-6E) "Examinations and Certificates – Radio Operators – Professional Rulings, Instructions and Examinations and Procedures May 1911 to December 1926" covers the history well, but sadly the file for the period 1927 and later has not been found.
9. Loadstone III Type 458E. Image: http://jproc.ca/britishmarconi/758d.html
10. Spurgeon G. Roscoe, "Spud," VE1BC. Maritime Memories; http://www.coastalradio.org.uk/spud/spudstory.htm. Spud's research, including lists of early call signs and other hard to find data, is a primary source of early marine communication in Canada.
11. Many RCC graduates, women and men, worked in the Monitoring and Intercept services. Ed Davey and others have documented the story of the Monitoring Service in articles such as "A Monitoring Pioneer." See http://www.radioalumni.ca/z_1976_a_monitoring_pioneer.htm; ROs also worked at the Ionosphere Stations, which were closely associated with the Defence Research Board. A good source of information on the Ionosphere stations is the web site of the Friends of the Communications Research Centre, whose newsletters on the site also contain stories of the ionospheric stations; http://www.friendsofcrc.ca/
12. LAC RG97 Vol. 8 File 4012-11 District Superintendent Meetings (1930s). Earlier correspondence shows a strong central control of radio communications regulations under Commander C. P. Edwards. With the instigation of the District Superintendent meetings, the views and

experience of the inspectors working in the field were accorded a high priority.

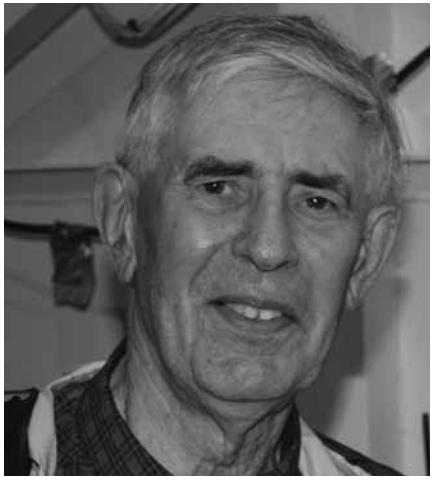
13. A. N. Fraser, "The Development of Radio in Canada," *Engineering Journal*, Vol. 13, Apr. 1930.
14. LAC RG97 Vol. 85 (6191-5 Pt. 1). May 1911–Dec. 1916 (R1203-17-6-E). Letter to Deputy Minister of Naval Service, Radio Telegraph Branch, 9 November 1918. Letters in the following paragraphs range from 1916 to 1923
15. Library and Archives Canada; 1908–1935 Border Entries; Roll: T-5461; The information on F. B. Hobbs is from Report of Admission at the Port of Niagara Falls, Ontario for month ending May 31, 1930.
16. Lloyd Swackhammer, *Radios of Canada*, Alma, Ontario, 2002; Stewart Warner was located in Belleville, Ontario. In 1931 the name was changed to Stewart Warner Alemite Corporation of Canada Limited
17. These included the model series 300, 500 and 700 which are identical to the same series published in *Official Radio Service Manual*, Hugo Gernsback ed., Gernsback Publications, New York, 1930.
18. Ian A. Anthony, *Radio Wizard: Edward Samuel Rogers and the Revolution of Communications*, (Gage Publishing Company for Rogers, Toronto, 2000) p. 85. The 1930 RCC alliance with Rogers-Majestic to form RSA would have opened up placements for RCC graduates of the technical courses.
19. LAC RG95, Radio Training Association of America (Canada) Ltd. Circa 1930.
20. During WWI, Canadian operators wore naval uniforms and were given naval ranks, although they continued to receive their civilian rate of pay. C. P. Edwards was accorded the rank of Lt. Commander.
21. "LAC Examination and Certification of Radio Servicemen," RG13 364 RG13, Vol. 364, File 287, Marine Radio (R188-39-8-E), Department of Marine and Fisheries.
22. Securities and Exchange Commission News Digest, Washington, D.C., May 7, 1959.
23. Canadian National Exhibition brochure, 1935, p. 112.
24. Source: The late Ernie Brown, whose remarkable adventures can be viewed at https://va3oeb.wordpress.com/
25. https://www.qsl.net/ylradio/archives/YLstor/history.html
26. LAC Subsidized Training for Radio Operators – General Arrangements. Letter of March, 31, 1943, signed by the Clerk of the Privy Council, Canada's senior civil servant. RG12 Vol. 1492 (R184-0-4E) Files 8061-5, Vols. 1 and 2 (Apr. 1942 – June 1946) Merchant Marine, Training Facilities.
27. DOT Letter, April 13, 1943. File 5806-1.
28. *Handbook for Wireless Operators*, 1938. The 1931 Handbook is available at: https://ia801702.us.archive.org/18/items/AdmiraltyHandbookOfWirelessTelegraphy1931/AdmiraltyHandbookOfWirelessTelegraphy1931.pdf. Canadian government stations between 1915 and 1922 were operated under the authority of the Naval Service.
29. Display ad, *Radio Craft*, May 1934, p. 697.
30. Olive J. Carroll, *Deep Sea 'Sparks': A Canadian Girl in the Norwegian Merchant Navy*, (Cordillera Publishing Company, Vancouver, 1993) p. 82.
31. Silas Tucker correspondence with the author December 2017.
32. The category of Radio Operator Learner was originally set up in 1927 calling for 12 words per minute and was intended to cover learners and operators in "tugs, fishing vessels, etc." It came in handy in the mid 1950s when a severe shortage of radio operators was encountered. (RG97-123 File number: 4003-4-1) Telecommunications and Electronics—International Telecommunications Union—Administrative and Extraordinary Conferences—International Radio Telegraphy Union Conference, Washington, 1927. 1925/05-1934/02. File.
33. The first-class examination required a higher level of questions but required at least a year of practical experience as a ship's officer at sea.
34. Marconi Transmitter on the *Reliance*; http://jproc.ca/britishmarconi/reliance.html.
35. There were several examples of fire danger on isolated stations. Eureka Weather Station was severely damaged by fire in Dec. 25, 1948, and Resolute Bay in 1963.
36. Source: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7259336.
37. LAC Subsidized Training for Radio Operators, RG12, Vol. 1492.
38. *Proc. IRE*, July 1951.
39. http://thecanadianencyclopedia.ca/en/article/canadian-national-exhibition/.
40. H. Nagata, and D. Wright, "A Short History of Maritime Communications," ITU *Telecommunication Journal* (ITU), Vol. 57 – II/1990, p. 123.

Acknowledgements

Radio historians and fellow RCC graduates Jerry Proc and Spud Roscoe, have, as always, been generous with their help and assistance. Laval Desbiens shared his voluminous research, while Bill Stadnyk kindly provided the author with a complete set of RCC lessons that had belonged to his friend and fellow radio operator the late Jim Roh. I am grateful to the staff of Library and Archives Canada and the Museum of Science and Technology for their help in researching archival documents.

About the Author

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



John Gilbert