

The expedition this year was equipped with two small motor launches, a gig, dories, tents and sectional wooden huts for erection at the main base. A magneto-striction echo sounding instrument, Admiralty pattern, was installed on the patrol vessel *N. B. McLean* for the joint purposes of facilitating the navigation of the ship and assisting in the hydrographic survey of the strait.

On July 9 the party sailed from Quebec on board the above vessel, reaching Resolution island on the evening of the 16th, where the ship was swung for deviation of the compass. Lake harbour was visited and left on the 19th and the Baffinland coast then explored for a suitable base of operations. An excellent boat harbour was discovered in an off-sheet of Barrier inlet, a few miles westward of Balcom inlet, and here was located the party's headquarters for the season.

On July 25 charting operations were commenced. A baseline was measured, triangulation stations built, and a tidal gauge erected in the neighbourhood. Astronomical observations were taken for latitude, longitude and azimuth, and from this point a network of triangulation was extended eastward and westward along the coast. This branch of Barrier inlet was named "Observation cove". Ice was encountered during the first week of the survey, but did not greatly hinder operations and on August 2 triangulation was completed and plotted from this base, and eventually extended to Pritzler harbour, 45 miles eastward. The sounding and coastlining was done from the motorboats, this craft leaving the main base at times with a boat in tow containing station building material, a tent, fuel, and a week's provisions.

On August 25 the *N. B. McLean* returned to Barrier inlet and for a week was employed by the hydrographers in offshore sounding, using the new echo sounding instrument.

One of the objectives of the party was to search for and verify, if possible, the existence of Griper rock, which has been shown on the old and existing Admiralty charts of this region. Its appearance on the chart is explained in the "Pilot" as follows:—

*"Griper Rock.*—The danger line on the chart marked Griper rock, 15 miles from the coast abreast Saddleback island, indicates the approximate position of an obstruction struck by the *Griper* on August 8, 1824; the vessel forced her way over the obstruction and on sounding, immediately after striking, no bottom was found with 25 fathoms of line out. Soundings taken in the vicinity by C.G.S. *Neptune* in 1903, gave no indication of an obstruction to navigation.

The officer in charge reports that, in an effort to find this rock they ship-sounded the area southward of the Middle Savage islands from twenty miles off the Saddleback to within two miles of the southern islands of the group. Soundings showed a very regular bottom with no indication of any danger. In the position of the obstruction as given above, there was found a depth of 100 fathoms. A heavy sea was running at the time and if there had been such an obstruction in that locality it would have been disclosed by breakers, as the *Griper* was drawing not more than  $2\frac{1}{2}$  fathoms, but no such indication was seen.

Several icebergs drifted by while they were sounding but none were grounded, nor have the local Eskimos, who were frequently interviewed on the subject during the summer, ever seen one impeded so far offshore. A number of large bergs were stranded about 4 miles off the mainland, and also in the foul ground amongst the islands, and it was concluded that the obstruction referred to as the "Griper rock" must lie somewhere in that vicinity.

In this vicinity the depths fall off very rapidly from all the islets and shoals. Only one mile southward of the above position, while sounding with the *N. B. McLean*, was there found a depth of 50 fathoms. Owing to the apparently foul nature of the locality it was not considered prudent to venture farther inshore.

After searching for Griper rock, ship sounding was extended to the westward and on August 31 the *McLean* returned to the survey party's main base, having completed 325 linear miles of ship sounding.

On October 7 the *McLean* picked up the party and proceeded eastward, arriving in Quebec on the evening of the 16th.

The following is a description of the Baffin island coast, surveyed and observed during the course of the season's operations:—

"In aspect, the southeastern coast of Baffin island is very bleak, bare rugged hills of gneiss and granite rising to elevations about 600 feet close to the sea and to greater heights inland. The ragged shore is broken by numerous fiord-like inlets, but from Pritzler harbour to Barrier inlet, 45 miles north-northwestward, the shore is fronted by many islets, rocks and shoals of a most dangerous character. The 50-fathoms contour, which lies at an average distance of 3 miles off the islands, should be considered the danger line.

"The country is quite uninhabited except for some Eskimos who travel gregariously along the coast in whaleboats (omiaks). These natives appear to be of a very good type,—healthy, honest and well adapted to the rigours of the country. Their habitat is both the north and south coasts of the long peninsula which separates Frobisher bay from Hudson strait. The small, swift rivers which flow into the heads of the inlets are well stocked with a fine species of salmon trout weighing up to 8 pounds; this food together with seal, constitutes their chief diet. At certain times a caribou hunt takes place and the hunters travel inland for several days to secure fresh meat. In addition, the country also provides aquatic fowl, ptarmigan, arctic hare and an occasional walrus or polar bear.

"In this locality the tides rise to a height of 35½ feet at springs, necessitating great caution when anchoring. Tidal streams run violently between the islands and when the wind opposes the current a heavy sea is created. Close to the southernmost island of the Middle Savage group the current was observed to run upward of 5 knots at the times of spring tides.

"Unfortunately, there are no good ship harbours between Pritzler harbour and Barrier inlet. The former has good depths and the approach appears to be clear, but it is rather open to southerly winds. Bond inlet, nearly abreast of Saddleback island, provides deep landlocked anchorage, but it is spoiled by the long approach between the islands and the narrowness of the entrance to the anchorage basin. Jackman sound, 8 miles westward of Saddleback island, dries at low water except for a small portion immediately inside the drying entrance. Balcom inlet (Icy cove) offers good, deep, landlocked anchorage, and would make an excellent harbour for wintering ships but it cannot be entered at all stages of the tide and the offing was found to be strewn with dangers.

"Barrier inlet is an arm of the sea extending 12 miles inland with an average width of about half a mile and with deep water inside. At the entrance the fiord is about one and a half miles wide, but two miles inside the width contracts to three-quarters of a mile. Here the channel is still further constricted by a number of rocky islets, connected at low stages of the tide and leaving only two narrow channels less than a hundred yards wide.

"The free flow of the tide in and out of the inlet being thus constricted at the narrows, a "head" of water is formed and creates a reversing falls. At the time of low tide on October 1, there was a sheer outward waterfall, 8½ feet in height, and the lowering of the fiordal waters continued for a space of 2½ hours whilst the tide was rising outside at the foot of the cataract. Slack water occurred for a few moments when the flood tide reached the elevation of the water in the fiord but almost immediately the inward rush of water formed whirlpools and great eddies and soon waves, 6 feet high, careened wildly from side to side. A boat attempting to pass through at such time would be engulfed.

"Shaftesbury inlet, about 3 miles eastward of cape Weymouth (Icy cape) is a bold fiord penetrating northward into the land between high, flanking rocky hills. It is eight miles long and varies in width from half to one and a half miles with deep water close to the shores. About 5 miles inside, a beautiful cascade tumbles over a high cliff which rises like a rock wall sheer from the water. Here a ship could take water by anchoring directly beside the cliff in 18 fathoms. Near the termination of the inlet an Eskimo encampment is located beside a stream flowing in over a series of wide rocky steppes. Another stream debouches at the head of the fiord. The inlet is free from shoals and provides shelter in suitable depths, but the entrance is encumbered with a dangerous rock and requires very careful navigation."

The following is a summary of the results of the hydrographic operations in Hudson strait during this season of 1933:—

Number of miles (linear) of ship sounding.....	326
Number of miles (linear) of boat sounding.....	330
Number of square miles charted.....	787
Number of miles coastlined.....	400
Number of survey stations and marks located.....	120
Tidal observations made.....	159 tides

As a result of the season's work a chart, "Pritzler Harbour to Cape Weymouth," with two harbour insets, will be published.

#### GULF OF ST. LAWRENCE, NORTH SHORE

As in the previous year the C.G.S. *Acadia* was fitted out at Halifax, under the command of Mr. J. U. Beauchemin, who had as assistants, Messrs. W. F. Elliott, J. A. Deveault, S. R. Titus, R. L. B. Hunter and M. S. Madden.

The ship and party left port on June 2, proceeding first to Shelburne, N.S., to pick up two motor launches, and thence to Great Bras d'Or bay, where an examination was made in connection with the removal of a wreck and correction to the existing Admiralty chart. The port of Quebec was visited and the motor-boat delivered to the patrol vessel *N.B. McLean*, for the use of the hydrographic party proceeding to Hudson strait.

The *Acadia's* surveying grounds on the North shore were reached on June 10, work commencing on the 12th. This consisted in completing the charting of the section of coast from Natashquan harbour to St. Genevieve island of the Mingan islands, and in carrying a triangulation scheme from St. Genevieve island to Clearwater point, near Havre St. Pierre. The sounding along the coast was conducted from motorboats for a distance off of about 2 miles, and thence seaward, the deepsea sounding was carried out by the *Acadia* using the latest model echo sounding recording apparatus.

The topography and shoreline along the coast was obtained from aerial photographs, specially taken by the Royal Canadian Air Force Photographic Section, for this service. A sufficient number of points or stations were built and connected by triangulation for the purpose of tying-in and co-ordinating the various photographs.

It was necessary in this connection, on account of the photographic work having been carried out rather late during the season, to employ two hydrographers and a small party with a schooner on this coast from Coacocho bay to Clearwater point, after the *Acadia* had left for Halifax.

The steamer sailed from this region on October 1, reaching Halifax on the 5th, and being laid up for the winter in her usual berth.

As a result of the season's work by the *Acadia*, the following charts were prepared for issue in the spring: "Washtawooka Bay to Piashti Bay," "Piashti Bay to Clearwater Point," and "Natashquan Point to Genevieve Island."

In addition to this, data was obtained which enabled revisions to be made to the following charts of the North shore, so that they might be issued to the public: "Little Mecatina to Natashquan Point," "Fog Island to Curlew Point," "Curlew Point to Washtawooka Bay," and one chart which includes the following harbours: "Coacocho Bay," "Washkuti Bay," "Kegashka Bay," "Natashquan Harbour," and "Piashti and Quetachu."

Summarized, the season's work comprised:—

Number of miles (linear) of boat sounding.....	950
Number of miles (linear) of ship sounding.....	1,150
Number of square miles charted.....	850
Number of survey stations built and observed.....	106

#### Magdalen Islands and Tidal Investigation

The C.G.S. *Cartier* was again employed on this work, the hydrography and the vessel being under the command of Mr. H. L. Leadman, whilst the special tidal investigation work in the Lower St. Lawrence was in charge of Mr. H. W.

Jones; they were assisted by Messrs, R. E. Hanson and L. M. Clarke, hydrographers, and Mr. R. B. Lee, Junior Tidal and Current Surveyor.

On May 10 the *Cartier* was docked at Pictou, and after completing fitting-out at Charlottetown, was cleared for the Magdalen islands on May 10.

Deepsea sounding was carried out in the neighbourhood of the Bird rocks and Brion island by means of a newly installed magneto striction echo sounder, Admiralty type, which was found to be very accurate and reliable. It furnished an accurate profile of the sea bottom passed over by the ship at full speed, and the results were reported to be greatly superior to those obtained by the slow sounding methods of past years.

This hydrographic work, in the neighbourhood of the Magdalens, was conducted until June 10, when the ship returned to Charlottetown where a new deepwater anchoring winch was installed for tidal work, whence the *Cartier* sailed for Matane, P.Q., on June 15 and engaged in the tidal investigation work in the St. Lawrence. At this port, Messrs. Jones and Lee joined the *Cartier* on June 19, and from June 20 to August 24, current observations were taken at a number of offshore stations, extending up the river as far as Father point.

With the approach of fall weather the tidal work was discontinued and hydrographic work again taken up.

A line of deepsea soundings was carried from the neighbourhood of cape Gaspe across to the gulf of St. Lawrence to Brion island, and the ship sounding resumed in the vicinity of the latter on August 29. The ship was laid up at Charlottetown on October 2.

During the season a harbour plan was made of Matane, P.Q., and the new meteorological station at Grindstone island was connected with mean sea level.

Summarized, the season's hydrographic operations comprised the following:—

Period of survey.....	134 days
Period of hydrographic work.....	60 days
Linear miles of ship sounding.....	1,551

SAINT JOHN RIVER SURVEY

The work of charting this river was again undertaken where left off the previous season; surveying and sounding was conducted from Swan creek, using Upper Gagetown first as a base, and the latter end of the season locating at Fredericton.

The work was in charge of Mr. M. A. MacKinnon, assisted by Messrs. G. E. Lowe and G. W. Baker.

During the first six weeks of the season progress was greatly hampered by the spring freshet which rose to the highest river level recorded in a period of ten years.

From May 22, when the survey commenced, until September 15, the charting of the river from Swan creek to a point 2 miles above Fredericton was carried out and completed. This included the examination and sounding of Oromocto shoals which governed the depth available between Saint John and Fredericton.

Summarized, the season's work included:—

Number of miles (linear) sounded.....	177
Number of miles of coastline.....	75
Area sounded..... (sq. miles)	12
Number of survey stations erected.....	235

As a result of the season's work, the third of the series of charts, which cover the river from Saint John harbour to Fredericton, was placed in the hands of lithographers and should be made available to the public during the coming season. This chart includes large scale plans of Sheffield channel, Oromocto shoals and Fredericton.

During the course of the operations there was also gathered supplementary data for the preparation of sailing directions for the Saint John river and the staff was further employed in the latter part of the year in the compilation and writing of these.

## ST. LAWRENCE RIVER

Operations in the St. Lawrence and the Saguenay were conducted by Mr. E. Ghysens, assisted by Mr. Paul Radakir, using the Hydrographic Service motor launch *Boulton*, in which had been installed a super sonic echo sounding machine. The *Boulton* left its winter quarters at Prescott Depot on May 26—the sounding machine was tested en route and in Montreal harbour. On June 6, Berthier en Bas was reached and headquarters established.

From this point triangulation work was conducted on the river between Quebec and the South Traverse. On July 10 the work in this neighbourhood was completed and the *Boulton* and party proceeded to Chicoutimi on the Saguenay, where sweeping and testing operations were conducted until September 1. Staff gauges were established on the Saguenay, sweeping was done with a 30-foot rail lowered underneath the keel of the launch, and soundings were taken with the echo sounding device; aids to navigation were checked and their positions located; and detailed data collected for the correction and revision of the existing charts.

Summarized, the season's work comprised:—

Number of main stations erected.....	12
Number of points occupied and observed.....	31
Linear miles of soundings.....	650

On September 14 the *Boulton* was again laid up for the winter at the Dominion Lighthouse Depot, at Prescott, and put into the hands of shipwrights for overhaul and considerable repairs.

## LAKE WINNIPEG SURVEY

As in previous seasons, a launch party conducted work in lake Winnipeg, in charge of Mr. J. L. Foreman, assisted by Mr. N. G. Gray. The party fitted out at Selkirk, Manitoba, and proceeded to Gull harbour on June 5 on board the s.s. *Keenora*.

The work this year was carried out in the lower part of the lake, along the routes leading to the mining districts.

It resulted in the preparation of a new chart, on a scale of 4,000 feet to the inch, covering the previously uncharted area from Observation point to Grindstone point, including the Manigotagan and Winipigow rivers, which are being developed as water routes to the central Manitoba gold mining areas.

The season's operations were completed on September 25.

Summarized, the details of the work were as follows:—

Number of miles of boat sounding.....	920
Number of miles of shoreline traversed.....	58
Area triangulated..... (sq. miles)	160
Area sounded..... (sq. miles)	110
Stations built and observed.....	49
Number of rocks and islets located and fixed.....	288

## MACKENZIE DELTA SURVEY

Under Mr. Norman Wilson, assisted by Mr. A. F. Wightman, hydrographic survey operations in the Western Arctic were carried on this season with the joint co-operation of the Hudson's Bay Company. The company supplied provisions, fuel and labour (crew), as well as launching the department's auxiliary

schooner *Pilot*—towing it to Aklavik and return and hauling out at Gravel point, Fort Smith, at the end of the season. The Department of Marine supplied and paid two hydrographic engineers and a gasoline engineer, as well as outfitting the schooner and defraying travelling expenses.

The *Pilot* left Fort Smith in tow of the Hudson's Bay Company tug *Pelly Lake* on June 11 and proceeded to Great Slave lake. Ice conditions in the lake delayed progress and it was the 24th before they reached Hay river. Stops were made at all the Company posts for the discharge of freight, and Norman was reached on June 27.

Here orders were received cancelling the *Pelly Lake's* trip to Aklavik and the *Pilot* was tied up to await the ss. *Distributor* which had been gradually catching up. They left Norman on the morning of July 2 under the schooner's own power, it being too rough on the river to tow alongside. From Good Hope to Arctic Red river they were towed, but near the latter place were again cast off on account of rough water, and proceeded by themselves. They reached Aklavik at 6.30 p.m. on July 4. The 5th was spent in beaching the schooner and adjusting the stern bearing which had become noisy. The *Distributor* arrived that afternoon and on the 6th, gasoline was transferred from the steamer to the schooner, small boats unloaded from the freight barge and taken in tow, and at 7.45 p.m. they left for Tuktoyaktuk.

The Anderton channel route was taken so that the hydrographers might check up on any noticeable changes that might have occurred in the channel surveyed in 1930. Nothing was found and the run to Tununuk was made without incident. The rain and heavy wind of the 6th continued until the forenoon of the 8th with very low temperatures and some snow. By noon on the 8th the weather had cleared and they made Tuktoyaktuk that night about 10.30, after stopping at Kittigazuit to interview local Eskimos. A shore camp was established on the 9th, and on the 10th active surveying operations were begun.

On account of the late arrival on the scene and the possibility of a gasoline shortage, it was decided that the surveys of Tuktoyaktuk harbour and approaches required by the company—as being the more important—should be done first, leaving the tying-in of those surveys and some wanted, but less urgent, exploration work for the end of the season, if time and fuel permitted.

The harbour and approach surveys were carried on together, fine weather being used in offshore work. By August 17 the harbour work had been completed and the approaches to the harbour had been sounded to a distance of 15 miles off the entrance; sufficient information being obtained for the publication of a harbour chart and an approach chart. Tidal observations were made by staff gauge, from July 12 to August 18. Two pairs of beacons were erected to enable craft to enter and leave the harbour (via eastern entrance) with safety and dispatch.

The weather this season was, in comparison with 1930, very unsettled. They enjoyed no periods of good weather that lasted more than two or three days, and between August 4 and 16, six full days were lost as well as parts of others.

By August 17 the gasoline supply was running low, fall weather had definitely set in and they were due at Aklavik on the 23rd to meet the *Distributor*. Camp was struck on the morning of the 18th and they reached Kittigazuit that afternoon through a heavy sea and driving rain. The following day was fair and they erected triangulation marks and observed them in order to tie in the season's work to the existing Topographic Survey monuments at Kittigazuit.

By the 20th the water was reasonably smooth and two lines of soundings were run from the cape, north of Kittigazuit, to the southern end of Henrickson island, thence to Kilewait harbour on Richards island and return, in order to secure some information as to the draft that might be carried from Kittigazuit into the estuary of the East channel. Considerable work could well have been done in Kittigazuit bay for depths and channels are reported to be erratic.

However, this one day was all that could be spared. They set out for Aklavik at 11 p.m. on the 20th, proceeding via the East and Oniak channels in order to conserve the gasolene supply, arriving there at 8 p.m. on August 23.

Soundings were taken practically all the way to Aklavik to obtain some idea of depths in the channel which will be used by the Hudson's Bay Company boats en route to Tuktoyaktuk. The existing maps of the river are on too small a scale to permit of recording them however.

Some 385 sea miles of sounding were done during the season and an area of 165 square miles was covered in Tuktoyaktuk harbour and approaches.

The party left Aklavik for Fort Smith in tow of the ss. *Distributor* on September 2, and reached Fort Smith on September 23, losing over seven days en route through bad weather.

The *Pilot* was hauled out at the Gravel Point yard of the Hudson's Bay Company on September 26 and housed over for the winter.

#### PACIFIC COAST DISTRICT

On the Pacific coast, hydrography was carried out by the new hydrographic ship *Wm. J. Stewart*, which was placed in commission for the first time, and by the Houseboat *Pender*. The steamer was under the direct command of Mr. H. D. Parizeau, assisted by the following hydrographic staff: Messrs. W. K. Willis, R. H. Ettershank, A. Stewardson, R. B. Young, H. N. McQuarrie, V. Wiebe and G. W. Lacroix.

On April 20 they left Victoria for coal at Union bay, and on return took on the *Pender's* crew and outfit, and on the 26th proceeded to the west of Vancouver island where, on May 1, the *Pender's* crew and outfit were transferred to the Houseboat, and the latter towed to its survey grounds in Refuge cove.

The *Wm. J. Stewart* returned to Victoria on May 4, carrying out en route phototopography of the Canadian shore of Juan de Fuca strait; on May 15, the ship proceeded to ship sounding grounds off the west coast of the island. During the conduct of these operations, topography of that section of the coast between Race rocks and Barkley sound was also obtained, covering an area of about 590 square miles.

In the early part of the season there was completed the examination and sweeping of the Clayoquot sound area and a triangulation extended from Estevan towards Nootka sound. Hesquiat harbour was surveyed and inshore sounding conducted along the coast and through the main channels of Nootka sound.

In August and September the ship resumed the charting of the Haro and Georgia straits in the neighbourhood of the international boundary, and in the latter part of September, returned to complete the charting of the entrance to Nootka sound.

Summarized, the *Wm. J. Stewart* carried out the following:—

Number of miles of ship sounding.....	788
Number of miles of boat sounding.....	1,458
Coastline surveyed..... (miles)	372
Topography, square miles.....	595

This work also entailed the erection of 311 hydrographic stations and the observing of 216 points; the sweeping of 40 areas and the occupying of 7 ship triangulation stations; the number of isolated shoal spots examined was, 123.

The Houseboat *Pender*, under Mr. J. H. Knight, assisted by Messrs. L. R. Davies, J. O. Johnson and J. I. Rutley, was placed first in Refuge cove and carried out a survey of that area and the boat sounding from Rafael point to Hesquiat harbour.

On June 1 it was towed to Nootka sound where the auxiliary party was employed for the balance of the season, making a complete survey of the various arms of this sound inside of a line from Anderson point to Marvenas bay.

During the season, the charting of this sound was completed with the exception of a small portion of the mountainous topography.

The *Pender* was laid up for the balance of the season on September 29 in Esperanza inlet, and her party returned to Victoria on the *Wm. J. Stewart*. The latter ship was laid up at Victoria on September 30.

Summarized, the *Pender's* party conducted the following:—

Number of miles of boat sounding.....	587
Number of miles of coastline surveyed.....	191
Number of square miles of topography.....	179
Number of shoals examined.....	66
Number of areas swept.....	59

There were also erected 301 stations and marks,—of these 158 having been observed.

In addition, this party took 220 horizontal photographs for mountain topography.

As a result of the season's work on the Pacific coast, the following charts were completed: "Inner Channels, Clayoquot Sound," "Barkley Sound," "Strait of Juan de Fuca," "Victoria Harbour," "Sooke Harbour," "Broken Group and Ucluelet Inlet," and "Plans in the Strait of Georgia."

The following charts are in the course of preparation: "Race Rocks to Turn Point," "Clayoquot Sound," "Clayoquot Sound, Inner Channels," northern portion, "Harbour Sheet of Juan de Fuca Strait," "Harbour Sheets in Barkley Sound," and "Harbour Sheets in Nootka Sound."

#### TIDAL AND CURRENT DIVISION

The annual work of preparing the different issues of tide tables for a year in advance was carried out as usual. The number printed, of all editions combined, for the year 1934 was 95,800. This is a reduction from the numbers for several years past, by reason of economy.

These tables comprise the following:—

*Atlantic Tide Tables.*—Atlantic coast (complete); Quebec and Father point (abridged); Charlottetown and Strait of Canso (abridged); Halifax and Sydney, N.S. (abridged); Saint John and Bay of Fundy (abridged).

*Pacific Tide Tables.*—Pacific Coast (complete); Vancouver and Sand Heads (abridged); Prince Rupert and Northern B.C. (abridged).

No changes were made in the tide table publications other than the addition of information resulting from the investigation of currents in the St. Lawrence estuary from Father point to pointe des Monts, and also with regard to the currents in the vicinity of the Wolfe cove terminal, Quebec harbour, both the results of recent work.

The principal tidal stations are:—

*Atlantic Coast.*—Quebec, P.Q., Father point, P.Q., Charlottetown, P.E.I., Saint John, N.B., Halifax, N.S., and Port Churchill, Man.

*Pacific Coast.*—Vancouver, B.C., Caulfields, B.C., Victoria, B.C., Clayoquot, B.C., and Prince Rupert, B.C.

The usual inspection of these stations was carried out and repairs to the recording apparatus and structures attended to as found necessary.

#### SEASONAL TIDE GAUGES AND TIDAL OBSERVATIONS

*Atlantic Coast.*—It was intended that a simultaneous tidal comparison between Rustico on the north side of Prince Edward Island and the Magdalen islands, at a point on the west side would be obtained, but the opportunity to

operate a gauge at the latter place did not materialize. However, additional records were obtained at Rustico which are valuable in extending the length of the basis of predictions serving the north coast of Prince Edward Island.

A seasonal gauge was also installed at Matane in conjunction with the investigation of the currents of the St. Lawrence estuary.

Good tidal data was obtained at Barrier inlet, Baffinland, from staff readings by the hydrographic party in Hudson strait during the past summer, and supplied this survey for reduction.

Similarly the hydrographers furnished daytime staff readings from Tuktoyaktuk harbour in the Mackenzie delta, extending over a period of five weeks.

The gauge at Churchill, Hudson bay, was attended throughout the open season by the engineers of the Hudson bay terminals.

The turning of the tidal streams in Hudson straits was again observed by the radio operators stationed at Resolution and Nottingham islands in a very satisfactory manner, and as the results corroborate those of the previous year, the behaviour of the tidal currents are proven to be regular.

#### INVESTIGATION OF CURRENTS

*Atlantic Coast.*—The investigation of the currents in the St. Lawrence estuary in the section between Father point and pointe des Monts, was continued, and as in 1932 the hydrographic charting steamer *Cartier* and hydrographic staff, under the command of Mr. H. L. Leadman, was employed for part of the season after its arrival at Matane on June 17. Mr. H. W. Jones was in charge of the investigational work, assisted by Mr. R. B. Lee.

Earlier in the season a survey of the currents in the vicinity of Wolfe cove, Quebec harbour, was made by the use of the spare lightship No. 23, loaned by the Quebec Agency. This work had been requested by the Pilotage Service.

*Pacific Coast.*—An examination of the currents in Vancouver harbour as they affect the berthing of steamers, was made by Mr. S. C. Hayden with the co-operative assistance of the engineers of the Vancouver Harbour Commission.

#### REPORTS OF TIDAL CURRENTS

Reports on tidal currents in pamphlet form, for assistance to navigation, as enumerated below, are available on request, except the latter two which are temporarily out of print; summaries of these, however, are included in the unabridged edition of the Atlantic Coast tide tables.

Currents in the Entrance to the St. Lawrence.

Currents in the Gulf of St. Lawrence.

Currents in the Bay of Fundy.

Currents in Belle Isle Strait.

Currents off the Southeast Coast of Newfoundland.

These deal with the currents to be met with in the outer areas of the main steamship routes; predictions for the turn of the tidal streams at places in the St. Lawrence river, in the strait of Canso, and other straits or passes are given in the Atlantic coast tide tables. The tide tables for the Pacific coast include similar information with regard to the passes and narrows there.

#### INFORMATION SERVICE AND OTHER AVAILABLE PUBLICATIONS

Information on tidal matters has been furnished in answer to frequent requests from engineers in the Government Service and in private practice, as well as to others interested. In addition to the tide tables and current reports, there are other publications which are mailed when written for. These are:—

Tide Levels and Datum Planes in Eastern Canada.  
Tide Levels and Datum Planes in the Pacific Coast.  
Tides at the Head of the Bay of Fundy.  
Tides and Tidal Streams in Canadian Waters (descriptive).  
Temperatures and Densities, Canadian (Atlantic) Waters.

#### REDUCTIONS AND REPORTS

The tidal records from both principal and secondary stations were all inspected, the datum lines determined, and such abstracts were made as were needed for the tide tables or for other purposes. Tabulation of the hourly ordinates of records for harmonic analysis was carried on as time of assistants permitted. Assistance was given in the preparation of the "British Columbia Pilot" by furnishing the tidal information. The data obtained concerning the currents in the St. Lawrence river near the Wolfe cove terminals, was reduced to a form for practical use and furnished to the Pilotage Service; the results will also appear in the 1935 Atlantic Coast tide tables.

#### STAFF

*Headquarters and Atlantic Coast.*—Mr. H. W. Jones, B.Sc., M.E.I.C., Senior Tidal and Current Surveyor and Officer in Charge, supervised the work at headquarters, Ottawa, which comprises the reduction of data, etc., the preparation of all "Tide Tables," attention to correspondence, and the work of both coasts generally.

*Pacific Coast.*—Mr. S. C. Hayden, Senior Tidal and Current Surveyor, with district headquarters at Vancouver, supervised the field work and inspected the permanent tidal stations on the Pacific coast, and assisted in the preparation of the Pacific coast tide tables.

#### PRECISE WATER LEVELS DIVISION

This division of the Hydrographic Service, under Mr. Charles A. Price, Engineer in charge, and with the same assisting engineering staff as for the past number of years, carried on as in former years the precise recording of the various fluctuations that occur in water surface elevations, continuously both day and night, of the Great Lakes-St. Lawrence waterways system, from Port Arthur to within 20 miles of Quebec, from which point seaward the rise and fall of the waters are principally of a tidal nature and are under continuous study and investigation by the Tidal and Current division of this Service.

#### FIELD ACTIVITIES

During 1933, continuous observations were maintained, on the Great Lakes, St. Lawrence river, and Lower Ottawa river, at 43 locations—one more than in 1932. Four hundred and eighty-nine months of records were tabulated, an increase of sixteen months as compared to 1932, and an increase of one hundred and five over 1923.

The regular annual or semi-annual inspections had to be somewhat curtailed due to extension of field installations during the late autumn.

The special observations, instigated in 1930 for the St. Lawrence Ship Channel survey, to record effects of dredging, construction, and remedial works, on the slopes of St. Marys Current (Montreal harbour), were extended by four series of observations during the summer and autumn, during which new low water records were established.

Special work carried out also included repairing the supporting crib of the recording station at Thessalon; at Cascades point, on the St. Lawrence river, the extreme low water levels in the autumn fell below the intake to the recording station's well, and staff gauge readings had to be resorted to in order that no lapse might occur in the records; at the Old Aqueduct station, near Montreal, two staff gauge readings each day were taken until the end of September, when the construction of the permanent automatic gauging station was completed and put into operation; at Grenville, on the Ottawa river, an automatic gauging station was constructed in the fall for full-year operation; at La Salle, on the Detroit river, the substructure of the recording station is becoming unstable, and in the coming season will have either to be abandoned or relocated.

#### OFFICE ACTIVITIES

The compilations again totalled well over 750,000 deductions which entailed the use of approximately 1,500,000 sets of figures. Twenty-eight standard "Precise Water Level Bulletins" were issued. One hundred and eighty-six profiles, graphs, curves, etc., were prepared or extended, an increase of fourteen over 1932. A total of 26,304 sheets of data were issued during the year, an increase of 293 over 1932.

The tri-monthly reports of lake Superior daily mean level, based on hourly readings at Port Arthur and at Michipicoten harbour, were again furnished to the Canadian and the United States members of the "International Lake Superior Board of Control" as required under international agreement.

The sixty curves, relative to the tilting of the Great Lakes basin, have been extended and further established the proof that this tilting will have to be given practical weight in hydraulic problems relative to this watershed. Extensive data relative to this subject was supplied, on request, to Dr. B. Gutenberg, California Institute of Technology, and Dr. Gutenberg's paper "Tilting due to Glacial Melting" published in "The Journal of Geology," Vol. XLI, No. 5, July-August, 1933, gave the Canadian Hydrographic Service due credit for the data supplied. The deductions established by Dr. Gutenberg agree very closely with the results obtained through our method of relative values, with the exception of minor points at which the author did not have true values, of local conditions, for some stations.

Considerable extensions were made to the mass curves of the lunar tidal values, based on the 1927-30 water levels of the Great Lakes. It is hoped that time may be available during 1934, to complete and analyse these curves, and prepare a statement of values and deductions which may lead to their practical use in determining the consistent generating factor for the variations, in direction and velocity, of well known currents in restricted channels.

The Department of Railways and Canals again supplied, each month in 1933, duplicate copies of their Lockmasters' reports of daily depth of water on the sill of the locks, at the head and foot of each canal, and this data was tabulated into our standard form. No progress can be reported in the tabulation and checking of similar back records, some to 1853, due to pressure of present activities carried on by this division.

Requests for general information and special data, have again exceeded past years. The cost of reproduction, by photostat copying or blue-printing being collected in most cases, except from associated government services or parties who are giving value in return for the data supplied.

Close co-operation has been continued with, and extensive data supplied for scientific researches, engineering and construction services, and navigation interests in general.

Profile No. 38-B-1 "Yearly means, with maximum and minimum monthly means of each year, 1860 to date," of the Great Lakes, has been extended to include the 1933 data, and is now available.

Profile No. 207 "Monthly means elevation of the Great Lakes, 1860 to date" was prepared and is now available.

The monthly bulletins, each of two sheets, were in all cases issued by the sixth day of the following month.

The annual bulletins, of 1933 water levels, consisted of five sheets, which were issued under date of January 15, 1934.

The annual profiles of comparative monthly mean water levels, 1860 to 1933, for each of the Great Lakes and Montreal harbour, consisted of five photostats which were issued under date of January 15, 1934.

A revision and extension of the general data bulletins, to incorporate the 1933 statistics, was made and the six sheets issued under date of January 15, 1934.

The six profiles 1860—date, showing yearly elevations of the Great Lakes and Montreal harbour, were extended and supplied to the administrative offices of the department.

Each month, as in past years, the Canadian Press Association was given a concise synopsis of the general changes in water levels, of the Great Lakes and the St. Lawrence river, and a short statement of the probable causes which produced the changes. Early in April, 1933, a forecast of the probable water levels to be expected, during the balance of that year, was made and supplied to the Canadian Press. The forecast was well borne out by the unprecedented low water levels during the late summer and autumn. All statements were published verbatim in the leading newspapers, serviced by the association, with due credit being given to the Canadian Hydrographic Service and the Department of Marine. Engineering Journals of Canada also published the monthly bulletin verbatim.

Attached are the following tabulations:—

1. Monthly Mean Water Surface Elevations of the Great Lakes during 1933.
2. Monthly Mean Water Surface Elevations of the St. Lawrence River during 1933.

#### CHART CONSTRUCTION DIVISION

This division of the work is under the direction of Mr. Gordon L. Crichton, Chief of Chart Construction, with Mr. F. J. Delaute, Assistant Chief of the Cartographic and Engraving staff of 13 cartographers, draftsmen and engravers.

During the fiscal year, ending March 31, 1934, approximately the same amount of work was performed as in the preceding year, as will be seen by an inspection of the table of comparisons appended.

Some new work taken up has had to be temporarily suspended, awaiting the receipt of necessary data and some charts proposed to be compiled are left in abeyance, on account of other more pressing obligations.

In addition to the regular work of this division, it has assisted the field parties in completing their fair sheets, in return for assistance given by members of the field staff in connection with hand corrections to charts.

During the year 48 charts, maps, prints and correction patches were in hand and for the most part published. They comprised the following: 15 charts and 3 index maps published from engraved copper plates, 20 charts and one index map printed by photolithography, one harbour plan traced and issued as a process print, 5 correction patches and 4 tracings of harbour plans prepared for issue as process prints for future editions of charts previously lithographed.

In addition to the above, the text of the official catalogue was revised to April 1, 1934, and a new edition printed.

## CHARTS PUBLISHED—1933-1934

Of the following charts, 4 were in the printer's hands before the close of 1932-33 and since received, 14 new charts were published and 3 were in the printer's hands, almost finished, and 14 new editions were printed and 4 were in the printer's hands at the end of the year, besides which, new editions of the 4 index maps for the catalogue, 5 correction patches, and one new chart and 16 new editions of process prints were printed.

## FROM ENGRAVED PLATES

<i>New Charts</i>		<i>New Editions</i>	
No. 49	"Lachine to Coteau and Carillon."	No. 59	"Kingston Harbour."
335	"Chatham Sound and Approaches to Prince Rupert and Skeena River."	63	"Toronto to Niagara River."
442	"Little Mecatina to Natashquan Pt."	64	"Kingston to False Ducks Is."
		69	"Bay of Quinte."
		76	"Lake Erie (General)."
		85	"McCoy Is. to Collins Is."
		86	"Georgian Bay to Clapperton Island."
		94	"Little Current."
		97	"Duck Island to Detour Passage."
		206	"The Traverses."
		208	"Grosse Ile to Quebec."
		211	"Father Pt. to Pte. Aux Orignaux."

## PHOTO-LITHOGRAPHED

No. 42	"Welland Canal."	No. 1	"Montreal to Longue Point."
45	"Carillon to L'Original."	8	"Head of Lake St. Peter."
46	"Pointe aux Chene to Papineauville."	21	"Quebec Harbour."
48	"Masson to Ottawa."	25	"Richelieu River."
307	"Juan de Fuca Strait."	26	"Richelieu River."
339	"Uchuelet Inlet."	77	"Howe Island to Kingston."
342	"Sooke Harbour."		
343	"Clayoquot Sound."		
441	"Buctouche River."		
445	"Saint John River."		
450	"Halifax to Cape Sable."		
452	"Plans of Harbours, North Shore of Gulf."		
454	"Curlew Point to Washtawooka Bay."		
502	"Cape Prince of Wales to Cape Weggs."		

## PROCESS PRINTS

P-1003 "Matane Harbbour."

## INDEX MAPS

4 maps for the official catalogue

## CORRECTION PATCHES

1	patch for chart No. 140—"Lake Winnipeg."
1	" " " " 431—"Mingan Passage."
1	" " " " 432—"Mingan Islands."
2	" " " " 405—"Hudson Bay and Strait."

## CHARTS COMPLETED AND READY TO BE PRINTED

No. 416—"Halifax Harbour."  
419—"Saint John Harbour."

CHARTS IN HAND TO BE COMPLETED DURING 1934-35

- No. 400—"Gulf of St. Lawrence."
- 344—"Dixon Entrance."
- 219—"Father Point to Quebec."
- 405—"Hudson Bay and Strait."

FAIR TRACINGS OF HARBOUR PLANS PREPARED

- No. 70—"Plans of Harbours (Lake Ontario)."
- 73—"Plans of Harbours (Lake Ontario)."
- 80—"Plans of Harbours (Lake Erie)."
- 413—"Bathurst Harbour."

NEW CHARTS OF FIELD PARTIES TO BE PUBLISHED 1934-35.

- No. 453—"Fog Island to Curlew Point."
  - 455—"Washtawooka Bay to Piashti Bay."
  - 456—"Piashti Bay to Walrus Island."
  - 457—"Natashquan Point to Genevieve Island."
  - 338—"Broken Group (Barkley Sound)."
  - 327—"Barkley Sound and Approaches."
  - 308—"Plans of Harbours (Strait of Georgia)."
  - 148—"Lake Winnipeg, Observation Point to Sandstone Point."
- |                                 |        |
|---------------------------------|--------|
| Number of charts corrected..... | 112    |
| “ “ copies corrected.....       | 8,142  |
| “ “ corrections.....            | 47,500 |

The following tabulation indicates the work performed during the year:—

NEW CHARTS COMPLETED

- No. 309—"Alberni Inlet."
- 500—"Cape Churchill to Egg River."
- 442—"Little Mecatina to Natashquan Point."
- 448—"Port Hood Harbour."

NEW CHARTS IN HAND

No. 453—"Fog Island to Curlew Point".....	95	per cent completed
454—"Curlew Point to Washtawooka".....	75	“ “ “
439—"Caraquet, Shippigan & Miscou Harbours".....	60	“ “ “
450—"Halifax to Cape Sable".....	95	“ “ “
435—"Strait of Canso and Approaches".....	98	“ “ “
315—"Victoria Harbour" (re-engraving).....	50	“ “ “
83—"Waubashene to Western Island" (re-engraving).....	98	“ “ “
89—"Giants Tomb to Lone Rock" (re-engraving)....	90	“ “ “

MISCELLANEOUS WORK IN HAND

Patch Plate, Borders & Grads. for Atlantic Coast charts, 1 mi. to 1 in. Mercator Projection.....	30	“ “ “
“ “ Borders & Grads. for Atlantic Coast charts, 2 mi. to 1 in. Mercator Projection.....	10	“ “ “

SUMMARY

The following is a summary of the foregoing with comparative figures for the preceding year:—

	1932-33	1933-34
First editions of newly engraved charts received or in printer's hands. ....	5	3
New editions of engraved charts carried over from 1932, completed during 1933 or at present in printer's hands.....	6	12
First editions of new charts photo-lithographed, received or in printer's hands. ....	18	14
New editions of existing charts, photo-lithographed carried over from 1932, completed during 1933 or in the printer's hands. ....	4	6

	1932-33	1933-34
New or new editions of charts, process prints.....	7	17
Index maps and diagrams printed.....	16	4
New charts completed and ready for publication.....	2	2
Correction patches prepared and printed.....	6	5
Fair sheets in hand partially complete.....	4	4
Fair tracings in hand.....	5	4
New editions of existing charts required.....	8	11
Assistance rendered field staff correcting charts.....	—	215 days

## CORRECTIONS TO PUBLISHED CHARTS

Total number of different charts corrected.....	116	112
“ “ copies corrected.....	10,518	8,142
“ “ corrections.....	48,907	47,500
Number of items filed.....	373	320
Correspondence, letters, reports, etc.....	271	208

## ENGRAVING

New charts engraved to completion.....	8	4
“ “ in hand.....	2	8
“ “ “ formerly photo-litho.....	3	4
Large corrections to copper plates.....	1	0
Small “ “ “ “.....	4,396	6,662
A small correction represents 15 minutes' time of an engraver.		

## CHART DISTRIBUTION DIVISION

During the twelve months of the calendar year 1933, there were distributed for sale to the seagoing public, marine engineering companies, shipping and transportation concerns; and for official use to government services, both federal and provincial, and to hydrographic departments of other governments, the following standard Canadian nautical charts and related navigation and hydrographic publications:—

Catalogues of Charts, Sailing Directions and Tidal Information, with index maps.....	1,000	copies.
Standard Navigational Charts.....	8,091	“
Special charts and process prints.....	436	“
Pilots and Sailing Directions.....	528	“
Tide Tables.....	98,500	“
Water Levels Bulletins, graphs, etc.....	27,251	“

The distribution division is in charge of Mr. P. E. Parent. The number of charts issued in response to requests was slightly under that of the preceding year. The Pilots and Sailing Directions, and water levels data was in excess of those distributed in 1932.

MONTHLY Mean Surface Elevations of the "Great Lakes," by Precise Water Level Division, during 1933

82120-53

		Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
Lake Superior.....	Port Arthur.....	601.95	601.78	601.66	601.83	602.36	602.69	602.77	602.74	602.78	602.71	602.57	602.35	602.35
	Michipicoten Harbour...	601.98	601.90	601.72	601.85	602.32	602.62	602.76	602.84	602.85	602.85	602.72	602.50	602.41
St. Marys River.....	Above Lock.....	601.52	601.43	601.27	601.44	601.92	602.20	602.28	602.38	602.33	602.36	602.24	602.05	601.95
	Below Lock.....	579.19	579.37	579.48	579.07	579.29	579.52	580.14	579.71	579.47	579.44	579.58	579.27	579.46
Lake Huron and Georgian Bay.	Goderich.....	577.70	577.72	577.63	577.87	578.36	578.65	578.68	578.53	578.17	577.96	577.75	577.59	578.05
	Collingwood.....	577.62	577.65	577.46	577.73	578.22	578.54	578.60	578.43	578.05	577.89	577.61	577.48	577.94
	Thessalon.....	577.66	577.62	577.43	577.80	578.32	578.60	578.66	578.43	578.09	577.92	577.62	577.49	577.97
St. Clair River.....	Point Edward.....	576.90	577.21	576.97	577.20	577.65	577.91	577.96	577.85	577.45	577.17	576.98	576.93	577.35
	Port Lambton.....	574.59	574.65	574.62	574.90	575.20	575.36	575.44	575.31	574.98	574.70	574.47	574.54	574.90
Detroit River.....	Tecumseh.....	573.34	572.73	573.23	574.05	574.37	574.34	574.29	574.06	573.67	573.33	572.98	573.05	573.62
	LaSalle.....	572.76	572.29	572.69	573.50	573.87	573.91	573.89	573.65	573.24	572.84	572.46	572.49	573.13
Lake Erie.....	Port Stanley.....	570.60	570.57	570.68	571.45	571.88	571.85	571.56	571.21	570.83	570.46	570.05	569.94	570.92
	Port Colborne.....	570.86	570.96	570.86	571.48	571.87	571.93	571.61	571.24	570.90	570.63	570.38	570.14	571.07
Lake Ontario.....	Kingston.....	244.21	244.13	243.99	244.60	245.13	245.23	244.99	244.59	244.25	243.80	243.36	243.30	244.30
	Toronto "A".....	244.27	244.13	244.12	244.76	245.28	245.33	245.08	244.73	244.37	243.89	243.47	243.46	244.41
	Port Dalhousie.....	244.24	244.15	244.14	244.75	245.28	245.33	245.08	244.73	244.38	243.87	243.46	243.46	244.41

"A" Records as taken by Toronto Harbour Commission, and referred to harbour datum as 244.79 feet above Mean Sea Level. Elevations are in feet above Mean Sea Level and are referred to the U.S. Lake Survey datum of 1903 adjustment. The Monthly Means are deduced by hourly ordinates from continuous graphic records.

## MONTHLY Mean Water Surface Elevations of the "St. Lawrence River," by Precise Water Level Division, during 1933

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		Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
St. Lawrence River.....	Prescott.....	243.53	243.37	243.24	243.79	244.26	244.39	244.13	243.76	243.48	243.04	242.63	242.56	243.52
	Lock 27.....	242.17	242.02	241.88	242.49	242.99	243.12	242.87	242.48	242.18	241.73	241.34	241.14	242.20
	Lock 25.....	225.96	225.47	225.41	226.51	227.25	227.38	226.88	226.27	225.81	225.11	224.44	224.03	225.88
	Lock 24.....	222.83	222.44	222.39	223.30	223.94	224.10	223.72	223.19	222.80	222.18	221.61	221.26	222.81
	Lock 23.....	211.20	210.89	210.72	211.66	212.28	212.42	211.99	211.48	211.02	210.44	209.90	209.73	211.14
	Lock 21.....	199.48	199.14	198.96	199.66	200.13	200.20	199.88	199.46	199.14	198.65	198.15	198.30	199.26
	Lock 20.....	151.82	153.91	153.94	152.64	152.56	152.55	152.73	152.74	152.54	152.28	151.72	153.31	152.73
	Lock 19.....	151.82	153.91	153.94	152.64	152.56	152.55	152.73	152.74	152.54	152.28	151.72	153.31	152.73
Lake St. Francis.....	Summertown.....	150.89	151.05	151.08	151.68	151.57	151.59	151.81	151.85	151.68	151.45	150.92	151.34	151.41
	Coteau Landing.....	150.52	150.45	150.45	151.25	151.17	151.19	151.38	151.43	151.28	151.07	150.60	150.92	150.98
St. Lawrence River.....	Coteau du Lac.....	133.08	132.92	132.87	134.20	134.05	133.61	133.22	132.95	132.72	132.12	131.63	132.16	132.96
	Cedars (P.P.P.).....	94.48	94.30	94.20	95.04	94.98	95.01	94.80	94.53	94.39	93.98	93.59	93.77	94.42
	Cascades Pointe.....	68.11	68.32	67.90	70.76	70.40	68.74	67.83	67.46	67.04	66.67	66.39	67.81	68.12
Ottawa River.....	Grenville.....	130.92	130.13	129.77	136.18	136.41	132.37	129.99	129.44	128.45	127.97	128.31	128.37	130.69
Lake of Two Mountains..	Ste. Annes.....	71.92	71.43	71.16	75.50	75.53	72.72	71.27	70.94	70.31	70.04	70.24	70.46	71.79
	Lock 5.....	66.70	66.36	66.02	69.45	69.17	67.45	66.42	66.02	65.58	65.20	64.81	65.55	66.56
St. Lawrence River.....	Old Aqueduct.....	61.02	60.58	60.43	63.35	63.12	61.71	60.85	60.52	60.14	59.83	59.52	60.06	60.93
	Montreal.....	27.08	32.53	27.49	26.24	24.73	21.32	19.71	19.27	18.54	17.87	17.54	25.96	23.19
	Longue Pointe.....	24.61	22.90	21.92	25.01	23.53	20.03	18.45	18.04	17.32	16.69	16.41	21.39	20.53
	Varennes.....	23.27	21.37	20.30	23.94	22.54	18.84	17.17	16.79	16.06	15.42	15.15	19.65	19.21
	Lanoraie.....	17.77	16.44	16.12	21.05	20.03	16.43	14.96	14.66	14.01	13.44	13.25	15.54	16.14
	Sorel.....	17.03	15.90	15.73	20.55	19.44	15.96	14.56	14.29	13.67	13.12	12.92	14.93	15.68
Lake St. Peter.....	Curve No. 2.....						14.24	12.48	12.18	11.53	11.03			
St. Lawrence River.....	Three Rivers.....	12.64	11.55	11.84	18.07	17.18	13.11	11.31	10.93	10.30	9.92	9.81	11.25	12.33
	Batiscan.....					13.81	10.49	8.99	8.69	8.23	8.00			
	Cap a la Roche.....					10.87	8.12	6.68	6.50	6.11	6.04			
	Neuville.....					4.29	3.20	2.38	2.19	2.18	2.16			

NOTE.—Prescott to Cornwall inclusive:—Elevations are in feet above Mean Sea Level and are referred to the U.S. Lake Survey datum of 1903 adjustment.  
 Summertown to Lock 5 inclusive:—Elevations are in feet above Mean Sea Level and are referred to the Department of Public Works precise levels of instrumental value.  
 Montreal to Neuville inclusive:—Elevations are in feet above Mean Sea Level and are referred to the Department of Public Works precise levels of 1915 adjustment.  
 Grenville:—Elevations are in feet above Mean Sea Level and are referred to the Department of Public Works precise levels of 1925 adjustment.

## AGENCIES' REPORTS

## HALIFAX, N.S., AGENCY

This agency has under its supervision 149 lighthouses, 1 light in private dwelling, 12 unwatched lights, 25 pole lights, 9 electric lights, 1 lightship, 27 storm signals, 20 diaphones, 1 steam fog alarm, 1 explosive fog alarm, 3 mechanical fog bells, 116 wharves, 6 life saving stations, 1 humane establishment at Sable island, 45 hand horns, 20 gas and whistle buoys, 20 gas and bell buoys, 9 gas buoys, 24 whistle buoys, 62 bell buoys, 75 can buoys, 58 conical buoys, 1,016 spar buoys, 14 stakes, 16 brush, 13 casks, 2 beacons, and four steamers: C.G.S. *Aranmore*, *Stanley*, *Lady Laurier* and *J. L. Nelson*.

The following changes were made to aids to navigation: Entrance to Negro harbour, range lights, North East harbour discontinued. Eastern Point channel, four wooden spar buoys established to mark approaches. Larry river, Torbay pole light moved to northeast end Ram island. Baccaro lighthouse was destroyed by fire and a temporary light established. Liverpool harbour front range light on dolphin southwest and Barrel rock, destroyed by ice.

Repair work and improvements were done at the following places: Ciboux island, Egg island, Flint island, Harbour island, Jeddore rock, Larry's river, Little Hope island, Mouse island, Maugers beach, Scatari island, South Ingonish, Sambro island (fog alarm), Thrumcap island, and Wedge island. Also to lightships Nos. 15 and 24, to buoys, Dartmouth Depot wharf and the Tidal Gauge at Halifax dockyard.

## DOMINION STEAMERS

C.G.S. *Lady Laurier*.—Employed in the eastern and western buoy services and attending to lighthouses. Commenced work on April 1, 1933, and on March 29 to 31, 1934, at Halifax Shipyards under repairs and on marine slip.

C.G.S. *Aranmore*.—At commencement of the season received annual repairs and was placed in dry dock. Started on supply trip for lighthouses on May 30. Employed on buoy service until July 1, when she went to Charlottetown and remained there until July 26. Was also at that agency from October 4 to December 9, when she returned to Nova Scotia agency for buoy service.

C.G.S. *J. L. Nelson*.—Mostly employed in harbour duty.

## CITADEL SIGNAL STATION

Record of shipping reported, etc., during the fiscal year is as follows: ships reported 1,408; arrived 1,408 and passed 170. Passed refers to vessels reported to Halifax but passing to other ports. Ships included in this statement were: British men-of-war, Foreign men-of-war, first-class steamers, second class, cable steamers and three-masted schooners.

## SABLE ISLAND

The necessary repairs were carried out to all the buildings at the three stations. All stations had very good crops.

There are 350 wild horses on the island. The stations were patrolled 77 times on account of fog, snow and heavy rain.

The population on the island is all told, 45 persons.

## VICTORIA, B.C., AGENCY

The business of the port of New Westminster showed a marked increase over the preceding year. In order to take care of this increase, as regards deep sea shipping, and, particularly to facilitate a night navigation of the Fraser

river, considerable improvements were carried out to the existing aids to navigation and provision made for further installation.

The lifeboats at Bamfield and Clayoquot have been in service all year, except for the time required for annual overhaul. Patrolmen were stationed on the west coast trail and patrol vessels were stationed at Bamfield during the winter months.

#### MAINTENANCE WORK

Repairs were performed to buoys, beacons, landing piers, etc., at: Native island, Ogden Pt., Portlock Pt., Point Upwood, Sisters, Point Atkinson, Trial island, Yellow rock, Pachena point, Quatsino, North arm Fraser river, First Narrows light, Fraser river, Fiddle reef, Cape Mudge, Victoria agency, Half Moon bay, Tofino, Discovery rock, Chatham channel, Courtenay river, Bare islet, Albert head, Squamish, and North Reef.

#### GOVERNMENT STEAMERS

C.G.S. *Estevan*.—Attended buoy and lighthouse services.

C.G.M. *Berens*.—Employed in buoy and lighthouse services, repairs to government wharves, etc.

#### LIST OF BUOYS AND BEACONS

Lighted buoys: 1 type 11 gas and whistling buoy; 7 type 9½ gas and whistling buoys; 4 type 8½ gas and bell buoys; 10 type 8½ gas buoys; 3 type 5½ gas buoys; 4 type 4½ gas buoys, and 1 wooden platform carrying oil lantern.

Unlighted buoys: 3 automatic whistling buoys; 5 surface bell buoys; 24 conical steel buoys; 35 can steel buoys; 3 small mine buoys; 113 wooden spar buoys; 14 wooden platform buoys; 7 iron buoys in Pitt lake.

Lighted beacons: 30 automatic acetylene gas beacons; 13 beacons using 200 m/m Aga lanterns; 44 beacons using 150 m/m Aga lanterns; 33 beacons using electric light; 8 beacons using oil.

Seventy-nine unlighted beacons, range marks, dolphins, etc.

#### LIST OF LIGHTSTATIONS, FOG ALARMS, FOG BELLS, ETC.

Three lightstations of the first order; 3 lightstations of the third order; 10 lightstations using catoptric reflectors; 10 lightstations of the fourth order; 4 lightstations of the fifth order; 1 lightstation of the sixth order; 9 lightstations of the seventh order; 26 fog alarms of the Diaphone type; 2 fog alarms of the Strombos air type; 4 fog alarms of the Reed type; 9 fog bells.

#### PRINCE RUPERT AGENCY, B.C.

This agency maintained 15 lightstations, 2 automatic fog bells, 49 automatic and Aga acetylene gas beacons, 7 gas and whistling buoys 9½ type, 3 gas and bell buoys 8½ type, 1 gas buoy 8½ type, 6 can buoys, 6 conical buoys, 28 day beacons and 22 spar buoys.

#### MAINTENANCE AND CONSTRUCTION WORK

Maintenance repairs were made at the Prince Rupert Depot and to the buoys and beacons. At the lightstations at Addenbrooke, Langara and Egg islands. To the wharves at Port Simpson and Bella Coola.

## DOMINION STEAMERS

C.G.S. *Newington*.—Was engaged in lighthouse and buoy service.

C.G.M. *Birnie*.—Was also busily employed in lights and buoy service.

C.G.S. *Estevan*.—Arrived from Victoria in August and attended to buoy service.

M.V. *Katherine B*.—Was engaged throughout the year in Ferry Service between Prince Rupert and Digby island, carrying passengers, freight and mail, also making emergency trips to local stations and beacons as occasion required.

## GOVERNMENT WHARVES

The following wharves are under the jurisdiction of the agency: Stewart; Massett; Bella Coola; Gross wharfage collected amounted to \$1,919.04.

## SAINT JOHN, N.B., AGENCY

There are under the supervision of this agency 172 light, fog-alarm and fog-bell stations, classified as follows: 7 unwatched lights, using A.G.A. acetylene; 4 fog-alarm stations only; 1 fog-bomb station; 2 fog-bell stations operated by machinery; 9 electric lightstations, one of which is a combined light and fog-bell station, and another a light and alarm; 1 station using a Banner burner; 3 stations having Mammoth No. 3 burners; 8 stations having Piper lanterns; 27 vapour lightstations, sixteen of which are light and fog-alarm stations combined; 108 stations using duplex lamps, six being combined light and fog-alarm stations; 2 stations with two range lights each.

At Peases island a Mammoth No. 3 lamp is maintained in addition to the 55m/m diamond vapour light.

At Mitchener point, where we have a duplex lamp, a second light is maintained of the Mammoth No. 3 type.

Also, the *Lurcher* Lightship, a red, steel steamer with two masts, equipped with light, diaphone and radio beacon, and manned by a crew of 15 is located on the *Lurcher* shoal, seventeen miles from Yarmouth, N.S.

Changes have been made in the lighthouse and fog-alarm service in this division during the past year at Digby pier light, N.S., and at Minudie light, N.S. (discontinued).

## MAINTENANCE OF BUOYS AND BEACONS

All buoys and beacons under the supervision of this agency, including those under contract, as well as attended by departmental steamers, have been well maintained during the past year.

The following is a list of those maintained under contract: 14 barrels, 3 dropping buoys, 3 spindles, 8 conicals, 6 cans, 15 bushed stakes, 7 miles bushing, 532 bushes and stakes and 362 spars.

The departmental steamers have attended to the following: 4 gas, 37 bell, 7 whistle, 8 gas and bell, 16 gas and whistle, 56 cans, 56 conicals, 116 spars, 25 spindles and 43 stakes.

## REPAIRS

Repairs were effected to the lights and fog signals at the following places: Argyle, Black rock, Bon Portage, Bunker island, Southwest light; Cape d'Or, cape Fourchu, Digby wharf, Hantsport, Highland village, Meteghan river, Parrsboro, Portapique, Seal island, Spencer point, Tongue shoal, Westport, Wolfville,

all in Nova Scotia, and at Beaver harbour, cape Spencer, Cherry island, Drew's head, Gannet rock, Head harbour, Marine Depot,—St. John west, Martin head, Fog Bell No. 17 St. John West, Partridge island and Pea point, in New Brunswick.

Life Saving Stations: This agency has the supervision of two life saving stations located at Bay View, N.S., and at Little Wood island, N.B.

#### MAINTENANCE OF WHARVES

The agency has under its control 144 wharves used by the public and the moneys collected for wharfage dues amounted during the year to \$17,493.

#### GOVERNMENT WHARVES

C.G.S. *Dollard*.—Employed continuously during the fiscal year 1933-34 in the lighthouse and buoy service. Was also occupied in breaking ice at the following harbours during February and March: Black harbour, Beaver harbour, Yarmouth and St. Andrews.

C.G.S. *Laurentian*.—Was also in continuous service connected with buoys and lighthouses. Laid up for repairs on September 11 and resumed work in lighthouse and buoy service on November 9 until the end of the year.

The crews of the above steamers were employed during the season in repair work to different lightstations, etc.

#### CHARLOTTETOWN, P.E.I., AGENCY

During the fiscal year ended March 31, 1934, this agency maintained 16 light and fog alarm stations, 40 lights over fourth order, 105 small lights other than pole lights, 90 pole lights, 7 Aga lights, 7 electric lights, 11 hand horns (fog), 1 electric fog horn, 2 life-saving stations, 1 direction-finding station, 2 coast radio stations, 3 radio beacons, 3 signal stations, 4 meteorological stations, 15 storm signal stations, 1 tidal gauge, 2 government steamers, and 94 wharves.

#### BUOY SERVICE

All the buoys under the supervision of this agency under contract, as well as those attended by Dominion steamers, were well maintained during the year.

The following buoys were maintained by Dominion steamers: 9 bells, 4 gas and bells, 5 whistles, 4 gas and whistlers, 2 gas buoys, 34 conicals, 24 cans, 4 casks, 37 spars, and 6 beacons.

The following buoys were maintained under contract: 299 cans, conicals and casks; 633 spars, 815 stakes, 904 bushes, 6 beacons, 1 bell buoy, 2 gas buoys and one gas and bell.

#### CHANGES IN AND ADDITIONS TO BUOY SERVICE

At Bedeque bay, Summerside harbour, P.E.I.; Buctouche, N.B.; Cascumpeque harbour, P.E.I.; Malpeque bay, P.E.I.; Miminegash, P.E.I.; Miramichi bay off Lower Neguac Wharf, N.B.; Miramichi river, Northwest Branch, N.B.; Murray river, P.E.I.; Pownal bay, Hillsboro bay, P.E.I.; Sandy Hook Channel, Magdalen islands; Shediac harbour, N.B.; and Tabusintac Gully, N.B.

The following buoys formerly maintained to mark the channel were permanently discontinued: Indian island, north channel; Fox river; Mink river.

## LIGHTHOUSE SERVICE

The annual maintenance supplies were delivered to all light and fog alarm stations, and official inspection was made of these properties. Due to the economy measures practised during the year, only the urgent repairs were effected to dwellings, oil houses, lantern towers, etc., at these stations. A small number of buildings and towers were painted during the year, and adjustments, renewals and repairs were made to apparatus where necessary.

## CHANGES IN LIGHTHOUSE SERVICE

At Arisaig, N.S.; Brighton Back range light, Charlottetown harbour; Darnley basin, Malpeque bay, P.E.I.; North Canso, north entrance to Gut of Canso, N.S.; Richibucto harbour, Northumberland strait; Richibucto head, Northumberland strait.

All lifesaving stations, radio beacons, storm signals stations and Dominion piers under the jurisdiction of this agency were well maintained during the year.

## DOMINION STEAMERS

The C.G.S. *Aranmore* arrived at Charlottetown on July 3, 1933, to take aboard supplies for our northern lightstations. She was engaged in delivering these supplies from July 12 to July 26, after which she again came under the jurisdiction of the Halifax agency. The *Aranmore* returned to this agency on October 4, to take aboard supplies for the fall trip to our northern lightstations. She was engaged in delivering same from October 13 to November 1. At Charlottetown until November 16 when she commenced the lifting of the larger buoys of this agency. She completed this work on December 5 and proceeded to St. Paul island on December 7 when she again came under the jurisdiction of the Halifax agency.

The C.G.S. *Bayfield* was not put in commission during 1933, but lay at the Marine wharf, Charlottetown, under supervision, throughout the year.

The C.G.S. *Brant* went into commission on May 6 and was engaged principally in lighthouse and buoy service. The ship was finally laid up on January 2, 1934.

The C.G.S. *Cartier* was fitted out at Charlottetown in the spring of 1933. She was engaged in tidal current and surveying work from May 19 to October 1, after which she laid up at Charlottetown for the season.

The C.G.S. *Montcalm* arrived at Charlottetown on May 11 to place the larger buoys of this agency. She completed this work on May 28 and again came under the jurisdiction of the Quebec agency.

## PARRY SOUND, ONT., AGENCY

## DOMINION STEAMERS

C.G.S. *St. Héliers*.—Landed keepers on outlying stations in Georgian bay, restored buoy service in Georgian bay and north section of Manitoulin island. Placed unwatched lights into operation.

Swept reported uncharted shoal, also assisted in hydrographic surveys, etc., of several ports in the Georgian bay under direction of Hydrographer, Mr. Bent.

The ship was painted, etc., and generally prepared for annual work.

Annual supply and inspection trip was commenced on July 10 and terminated September 19.

From October 27 on the vessel was utilized to the best advantage in serving lights, also correcting gas buoys in the division. She commenced retrieving buoys for the winter on November 20 and completed that work safely on December 16.

The *St. Héliers* laid up at Midland for the winter.

C.G.S. *Murray Stewart*.—Landed keepers at outlying stations in lake Superior east end, restored Pancake shoal gas buoy to position, also certain spars in locality. Re-commissioned unwatched lights in the North Channel, assisted *St. Héliers* in restoring spar buoys, as well as re-commissioning unwatched lights in the Georgian bay, painted beacons and served coal to fog alarm stations. By order of department, vessel laid up at Midland, until the fall season, and the crew was paid off excepting the captain and second engineer, who were retained as watchmen. Vessel re-commissioned. Retrieved Pancake shoal gas buoy and removed all keepers in east end of lake Superior. The vessel laid up at Sault Ste. Marie for the winter.

There are in the division some one hundred and fifteen government wharves for administration as to maintenance and inspection, most of which were inspected and reported on by the Superintendent of Lights during the year. Of these wharves fifty come directly under the agency's supervision for collection as well. However, collections were received from only twenty-one wharves, there being no traffic to some, twelve having no wharfingers, and several others being closed to traffic.

The following is a list of the number of various types of buoys and beacons maintained by both vessels in the immediate district during the season:—

Iron other than gas: 3 bell, 1 conical, 1 whistling. Gas, 21; Spar, 292; and day beacons, 56.

Repairs, improvements and general work was done by the agency staff during the year at lightstations, etc.

All Parry Sound unwatched lights, also spar buoys in the inner channels between Parry Sound, Waubaushene, Fesserton, Coldwater, and the channel between Parry Sound and Shawanaga bay, were maintained by the agency staff with our launch *Duncan*.

During the winter of 1933, forty-three Pintsch and twenty-five Aga, total sixty-eight lanterns were overhauled and tested in the agency, after which they were re-shipped to their different subdivisions for service.

The work performed by the subdivisions at Amherstburg (Mr. George Gott) and Fort William (Captain F. J. Dyer) during the fiscal year was supervised by the agency in the usual manner.

#### FORT WILLIAM, ONT., SUBAGENCY

April 1.—Tug *James Whalen*, assisted by the *Strathmore*, started breaking ice.

April 18.—Tug *James Whalen* left with lightkeepers for eastern end of this division.

April 20.—Tug *Strathmore* left with lightkeeper for Victoria island. The steamers *Winnipeg*, *Saskatoon*, *Mondoc*, *Lemoyne*, *Gleneagles*, *Canadoc*, *Soodoc*, *Mount Louis*, and *Keewatin* were the first ships to leave the head of the lakes for the spring of 1933.

April 21.—The ss. *Stadacona* and *Assiniboia* were the first steamers to arrive at the head of the lakes (Fort William) for spring of 1933.

August 31.—C.G.S. *St. Heliers* arrived in Port Arthur, surveying Port Arthur main entrance light. Surveying wreck of the tug *Joe Smith* in Amethyst Harbour and the uncharted rock S.E. of Pie island.

October 28.—Tug *James Whalen* broke ice at upper turning basin at Fort William.

November 26.—Retrieved Hare island and Welcome island gas buoys.

December 4.—SS. *Rahane*, last steamer to leave head of lakes for season.

December 6.—Retrieved harbour gas buoys and placed same on breakwater.

December 14.—All lightkeepers removed from west end division of lake Superior.

December 15.—All Aga beacons placed out of commission.

December 18.—Five cases containing lanterns for gas buoys sent to Parry Sound for overhauling.

Eighty-five cans of new carbide and ten cans of carbide saved when cleaning out buoys, were used to charge the 5 gas buoys in the spring of 1933.

#### SUB-AGENCY AT KENORA, ONT.

During the year all the aids to navigation were examined, repaired and painted. The sub-agency has the control of the following aids: Lake of the Woods: 3 lights watched; 6 lights using acetylene A.G.A. unwatched; 2 lights electric, unwatched and 485 cedar spar buoys. On Rainy lake, one electric range light and 71 cedar spar buoys. Winnipeg river, 47 cedar spar buoys. On Shoal lake, 24 cedar spar buoys. On lake Wabigoon, 26 cedar spar buoys.

The tugs *Larchmount* and *Atus* were employed from the 23rd May to June 9 looking after the buoys on lakes of the Woods and Shoal. From June 12 to 14, the motor-launch *Moose* attended to the buoy service on lake Winnipeg. From June 22 to 26, the tug *Lizbeth* looked after the buoys on Rainy lake and the motor-boat *Mist* was employed on similar services.

#### QUEBEC, P.Q., AGENCY

The total shore line of the district is about 1,800 miles, and it comprises many water routes varying from the main gulf routes and the St. Lawrence river to many small intricate and comparatively shallow channels.

The north channel of the St. Lawrence river (from the foot of the island of Orleans to Ile-aux-Coudres) was made use of extensively by deep draft ocean liners, and this route is becoming more and more popular with masters of vessels and pilots.

The official inauguration of the north channel was made on September 29 by the Minister of Marine, who was accompanied by many departmental officials as well as a number of Quebec and Montreal shipping and commercial leaders.

During the past fiscal year the following aids to navigation were maintained under the control of this agency: four lightships—Red Islet No. 3, White Island Reef No. 5, Prince Shoal No. 7 and Lower Traverse No. 20; 297 lights; 53 mechanically operated fog alarms, hand fog horns and fog bells; 3 explosives (bomb signals); 2 submarine bells; 359 buoys and stakes maintained by contractors; 10 gas buoys maintained by contractors; 1 gas and bell buoy maintained by contractor; 68 gas buoys; 13 combined gas and bell buoys; 1 bell buoy; 44 unlighted buoys; 16 unwatched gas beacons; 69 day beacons; 33 storm signals; and 110 wharves.

Aids to navigation were established in 1933-34 at Bathurst, Cap à l'Aigle, Montmagny and St. Michel de Bellechasse; and repairs, alterations, improvements and changes have been made to aids at Bathurst, Hamilton cove, Murray bay, and North Channel.

Aids to navigation were discontinued at Bathurst, Chandler, Outardes bay, Off Portneuf river (temporarily), Escoumains, Upper Traverse pier, Montmagny, and St. Michel de Bellechasse.

One hundred and fifteen wharves are under control at the Quebec agency of the Department of Marine, five new wharves having been added, viz: Campbellton ferry wharf, Cross point, Notre-Dame du Lac, Paspébiac (N.J. & W.) and Pointe aux Trembles.

#### DOMINION STEAMERS

C.G.S. *Mikula*.—At the beginning of the fiscal year she was occupied at icebreaking operations between Three Rivers and Montreal, in connection with the opening of navigation, returning to Quebec on April 14. She did not proceed on ice patrol duty in the gulf of St. Lawrence and Cabot strait. The vessel was docked for repairs and by degrees nearly all the crew paid off, leaving finally aboard only the master, Chief Officer and Chief Engineer to act as caretakers or watchmen. On July 31 the Chief Officer was paid off. During the months of August, September and October, the ship was laid up definitely, and it was only on November 27 that she left Quebec to start outside work assisting ships up and down the river. The vessel was engaged for the most part of December, in convoying ships up and down the river. On December 21, the ship returned to Quebec. From then on she was occupied in assisting ferry boats and in breaking ice jams at the Quebec bridge. On January 4 in accordance with departmental instructions she left at once to go to the assistance of the C.G.S. *Montcalm* which was stuck in the ice off Baie-des-Chaleurs with the ss. *Aranda*. On her way down the river she assisted the ss. *Sable I* to the wharf at Franklin, north shore, on January 7. On January 8 she reached the *Montcalm* and *Aranda*, and gave coal to the former vessel, besides assisting both these ships through much ice, subsequently proceeding towards North Sydney, C.B., she then assisted ships in and out of the harbour of Louisburg, and also broke ice in several harbours along the coasts of Nova Scotia and Cape Breton. During February, up to the 27th, she continued breaking ice on the coasts of Nova Scotia and Cape Breton, and rendered assistance to ships in and out of the harbour of Louisburg. After this she was ordered to proceed to havre St. Pierre, on the north shore of the gulf St. Lawrence, with 30 tons cargo for the Hudson Bay Company. On March 7, she arrived at havre St. Pierre and after unloading her cargo she assisted the ss. *Sable I* in and out of that harbour and then towards Quebec up to Seven islands where she left the *Sable I* and proceeded towards Quebec, arriving here on March 10. After this she was kept on stand-by for any arising emergencies.

C.G.S. *N. B. McLean*.—This vessel was in commission the year round. On April 1 this icebreaker left Quebec for ice patrol duty in the gulf of St. Lawrence and was engaged in this work until May 9, when the patrol was discontinued, the ship then proceeded to the strait of Belle Isle for the purpose of investigating ice conditions there and returned to Quebec on May 19. The vessel then remained at Quebec for overhaul, dry docking and loading of cargo in preparation for her voyage to Hudson bay, sailing from here on July 9. On her way to Hudson strait she was instructed to make a survey of ice conditions in the strait of Belle Isle and in the vicinity of the Atlantic entrance. The ship returned to Quebec, on October 16. Owing to the very severe weather, ice formed very early on the St. Lawrence river this year, and this vessel was kept

actively engaged in assisting and escorting ships inward and outward, towing lightships, picking up buoys, etc., and especially was she kept busy during the period November 20 to December 25 when she worked day and night practically. During the winter season the icebreaker was occupied in keeping the channel open to Three-Rivers, and in breaking various and numerous jams between Quebec and Three-Rivers. On February 28 she started icebreaking operations in connection with the opening of the channel between Three-Rivers and Montreal and continued at this work until March 6 when she returned to Quebec for bunkers, and on March 9 she resumed operations again arriving at Montreal on March 28, completing the clearing of the Ship Channel, and on March 31 the ship was at Three Rivers getting ready to leave from there the next morning for Quebec.

C.G.S. *Montcalm*.—At the beginning of the fiscal year this vessel was stationed at North Sydney, C.B., and was under direct instructions from the department in Ottawa. She returned to Quebec on June 3. On July 12 left King's wharf for Champlain dry dock. The crew was all paid off on July 25. In commission about November 15 in connection with buoy service. She was stationed for a good while at North Sydney, C.B., and Louisburg, N.S., having left Quebec on December 21 to assist the ss. *Aranda* caught in ice at Carleton, Baie-des-Chaleurs, and thence proceeded to North Sydney where she arrived on January 18. The ship experienced considerable difficulty when assisting the ss. *Aranda* in the ice off Carleton, Baie-des-Chaleurs, and so much so that it became absolutely necessary to send the *Mikula* to her aid and this vessel left on January 4 from Quebec. A good idea may be had as to the strenuous trip she made when it is considered that she reached North Sydney 29 days after her departure from Quebec. At the end of the fiscal year she was at North Sydney, C.B., or Louisburg, N.S., in accord with the exigencies of her service and conditions existing.

C.G.S. *Sauvel*.—At the beginning of the fiscal year this icebreaker was at Victoria pier (Montreal). She kept working up and down, as far as Three Rivers, up to April 11, when she arrived at Quebec, and after this again resumed icebreaking operations between Quebec-Montreal for some days. On April 24 she left for the Saguenay river to break ice there and returned on the 26. On April 27 she left Quebec for Three Rivers and then Sorel, at which latter place she was for some days, then going to Vickers dock at Montreal, and then on July 1 being towed to Sorel where she laid up for the summer and early fall. About the middle of November she was ready for service, proceeding to Three Rivers to take up her Fall station at that point and render assistance to all ships in need. Whenever the exigencies of her service brought her down to Quebec she was utilized in connection with icebreaking operations in the port, assisting the ferry boats in maintaining the service between the cities of Quebec and Levis, and doing other auxiliary work for the agency. The end of the fiscal year found her actively engaged in icebreaking operations between Three-Rivers and Montreal, more particularly in the surroundings of Montreal, preparatory to the opening of navigation.

C.G.S. *Lady Grey*.—At the very commencement of the fiscal year this vessel was at Three Rivers engaged in icebreaking operations between that place and Sorel, in connection with the opening of navigation, and she was under the direction of the River St. Lawrence Ship Channel Branch of the department. She also carried on icebreaking operations between Sorel and Montreal, and then proceeded to the shipyard at Sorel where she was for some time and after this attended to various routine work for the department. On June 25 she left Quebec with the Governor General and party for Anticosti island. The vessel was then temporarily laid up here, and repairs of a general character effected. On July 30 she left for Montreal to meet the Minister of Marine, and on August

2 proceeded down the river with the Minister and party. On September 29 the new North Channel was officially inaugurated by the minister and official party of departmental officers and business and commercial men. She was then temporarily laid up again for about three weeks. On November 17 left Quebec for above river and from then on kept actively engaged in icebreaking operations above Quebec regarding the closure of navigable season and rendering assistance to ships in and out of the river. At the close of the fiscal year she was on the gridiron at Levis for necessary repair work.

*C.G.S. Druid.*—This ship was occupied, as in past seasons of navigation, in buoy service work in general and lighthouse supply duty from Platon (about 40 miles above Quebec) to Father Point (about 158 miles below Quebec), covering a distance of about 198 miles. She was definitely laid up on December 31.

*C.G.S. Mardep.*—Was employed in the lighthouse and buoy services from April 9 to December 6, 1933.

*C.G.S. Loos.*—Engaged in lighthouse and buoy services from April 8 to November 23, 1933, when she proceeded to replace the pilot tender *Jalobert* at Father Point wharf. Was out of commission on December 6, at Quebec.

*Relief Lightship No. 25.*—In commission from April 7 to July 6. She was occupied attending to buoy work and in replacing lightships, most of the time being spent by her on the station of the Prince Shoal.

*C.G. Tug Citadelle.*—This vessel being kept constantly under steam was always ready to leave at a moment's notice when a report was received that there was a fire in the harbour or vicinity, and in this respect she proved very useful on several occasions. In the early spring she was engaged for whatever buoy work she was able to perform, and in moving departmental vessels and lightships from one place to another according to the exigencies of our Service, and in the Fall she was also occupied in buoy work connected with the closing of navigation and rendering assistance of a general nature to departmental and commercial vessels manoeuvring with difficulty due to ice conditions.

#### MONTREAL, P.Q., AGENCY

The total expenditure of this agency for the fiscal year ended March 31, 1934, amounted to \$387,471.90, being an increase of \$90,354.17 as compared with 1932-33. This increase derives from the aids to navigation and the government steamers.

All the lightstations were well attended to; the buoys, dominion steamers and scows were kept in good condition.

All the wharves were well kept during the season, repairs being done where necessary.

#### PORT WARDENS' REPORT FOR THE YEAR ENDED DECEMBER 31, 1933

Reports were received from 15 port wardens; 6 from Nova Scotia, 4 from British Columbia, 3 from Quebec, and 2 from New Brunswick.

The total amount of fees collected at the main ports amounted to: Vancouver, \$19,788; Montreal, \$19,188; Halifax, \$3,540; New Westminster, \$3,512; Quebec, \$2,184; and Victoria, \$2,078.

#### PORT OF MONTREAL

*Overseas and foreign-going vessels.*—Steamers 958 net tonnage 3,769,941 tons, being an increase of 48 vessels and 121,462 tons over 1932. Of the total overseas vessels 542 were registered in Great Britain and 108 in Canada. Other

nationalities: 308, being an increase of 7 British ships, 19 Canadian and 22 foreign from last year.

*Lower port vessels.*—Vessels, 313 of 622,061 net tons being an increase of 11 vessels and 78,890 tons, or a total increase of 59 ships and 200,352 tons.

March 25.—The C.G.S. *Saurel* and *Mikula* government icebreakers arrived at Montreal at 5 p.m., being two days earlier than the previous year. There was still considerable ice in the river.

April 14.—The ss. *Boston City* arrived; being four days earlier than last year. First from overseas.

April 15.—The ss. *Belle-Isle*, first entered from the lower ports, one day later than 1932.

April 17.—The first transatlantic passenger steamer T.S.S. *Montclare* came in one day earlier than the previous year. She left on April 21, also a day earlier than 1932.

The ice conditions were exceptionally good in the gulf of St. Lawrence this spring (1932) and with the service of the government icebreakers, vessels arriving report no ice damage.

November 20.—Night navigation was suspended in the river, Marine Department withdrawing buoys owing to unprecedented ice conditions. This is the earliest date on record since night navigation was established. In consequence several regular liners, owing to ice condition above Quebec, decided to make the latter place their terminal port.

November 25.—*Duchess of Bedford*, last passenger steamer to sail for overseas; 4 days earlier.

November 30.—SS. *Man. Regiment*, last cargo liner sailed; one day later than last season.

December 3.—Lower ports, Newfoundland and New York—The *Dominica* went out same date as last year.

December 5.—SS. *Nidarholm*, cargo, grain, general and cattle—2 days earlier.

December 6.—In ballast, the *Oxelsund*, one day earlier.

December 10.—SS. *Fjeld*, norwegian steamer; last arrival of season. Took on grain, cargo, and on December 14 ready for sea but owing to ice condition, sailing was cancelled and vessel wintered at Montreal.

#### CASUALTIES BETWEEN MONTREAL AND QUEBEC

April 14.—SS. *Nyanza* stranded near Portneuf. Refloated and returned to Quebec, leaking badly.

June 9.—SS. *Levnet* touched bottom off Matane, making considerable water. Docked at Montreal for survey after discharging cargo. Found extensive damage.

November 15.—SS. *Canby* grounded near Varennes. No damage.

November 17.—SS. *Antonia* touched bottom below Lotbiniere wharf, 43 miles above Quebec. Proceeded to Quebec after survey.

November 18.—SS. *Simonburn* stranded near Beauport Flats. Refloated at high water. Proceeded to Quebec for survey; considerable repairs necessary.

November 18.—SS. *Pennyworth* stranded near St. Jean, Isle of Orleans. After many unsuccessful attempts to refloat her, the vessel was abandoned for the season.

November 21.—SS. *Canadian Farmer* grounded near Three Rivers; no damage.

November 25.—SS. *Beaverdale* grounded 40 miles below Quebec, no damage.

November 28.—SS. *Zenda* grounded Brûlé Bank; refloated.

November 28.—SS. *Voluntas* grounded near Stone Pillars; no damage.

December 7.—SS. *Nidarholm*, *Oxelsund*, *Trajan*, in convoy of icebreaker, grounded.

#### EXPORTATIONS

There was a very considerable decrease in the shipment of grain from Montreal compared to the previous year, but in the matter of flour, apples, butter, eggs, box meats, lard, metals, lumber and cattle, the increase was very large.

#### LIVE STOCK SHIPMENTS

LIST of live stock shipped to ports in Great Britain during year 1933:—

	Cattle	Horses	Mules
Quebec.....	1,282		54
Montreal.....	38,780	3	322
Saint John.....	2,171		54
Halifax.....	1,110	7	

#### SALVAGE SERVICES RENDERED BY QUEBEC SALVAGE AND WRECKING COMPANY, LIMITED DURING THE YEAR 1933

April 14-25.—British steamer *Nyanza*, with cargo of coal, struck bottom a short distance up the river from Quebec and returned to wharf, at Quebec, with Nos. 1 and 2 tanks full of water and No. 1 hold leaking seriously. The ship was drawing over 30 feet forward and water level in No. 1 hold was about 8 feet from the deck. Coal hoister on dock was used to discharge cargo from Nos. 1 and 2 holds.

Salvage steamer *Lord Strathcona* was ordered to the assistance of *Nyanza*. Six inch pump and ten inch pump were installed in No. 1 hold. As cargo was discharged, the construction of stage was started in No. 1 hold and both pumps were installed for the voyage to Montreal.

During April 17 the *Lord Strathcona* convoyed the *Nyanza* toward Montreal and when relieved by the master, off Sorel, the *Lord Strathcona* turned about for Quebec where she arrived at 9 p.m., April 18.

July 30.—British steamer *Duchess of Bedford* required the service of a diver to examine the starboard propeller.

August 12.—British steamer *North Shore* stranded on Caribou island, near Pointe des Monts, north shore of gulf of St. Lawrence, about 240 miles below Quebec. At 7.30 a.m., August 13, salvage steamer *Lord Strathcona* left Quebec

for the scene of stranding. 6.30 a.m. August 14, *Lord Strathcona* anchored off the steamer; thick fog. Boarded the steamer and ascertained that Nos. 1, 2 and 3 tanks were full, afterpeak leaking, No. 1 hold full and leaking seriously, No. 2 hold, engine and fire rooms dry, starboard tunnel full and small leak in No. 3 hold. At 11.00 p.m. August 16, the *North Shore* was floated, taken to Trinity bay, where diver wedged leaks, salvage pumps were operated as required, and vessel proceeded under own power, toward Quebec. The *North Shore* was short of fuel and *Lord Strathcona* took her in tow about 7.30 p.m. August 18. About 7 p.m. August 19, *North Shore* entered Lorne dry dock, and service concluded.

August 12-13.—British steamer *Letitia* requested the service of a diver.

October 23-24.—German steamer *Hans Leonhardt* lying at Indian cove, Lauzon, requested the service of portable 6-inch motor centrifugal pump, with suction and full equipment also pump engineer.

November 6-8.—Norwegian steamer *Putten* with cargo of pulpwood, was reported ashore in ice at head of Chaleur bay, Campbellton, New Brunswick, about 500 miles from Quebec. About 11.55 a.m. salvage steamer *Lord Strathcona* left Quebec for the scene of the stranding, and at 6.00 a.m. November 7, *Lord Strathcona* received word that the *Putten* was afloat and proceeding toward Baltimore. *Lord Strathcona* returned to Quebec. Distance run 390 miles.

November 18.—British steamer *Simonburn* with cargo, stranded on Beauport flats about two miles down the river from Quebec. At 10.30 a.m. salvage steamer *Lord Strathcona* left Quebec to render assistance to the *Simonburn* and at 11.45 a.m. *Lord Strathcona* arrived off the ship. About 5.00 p.m. *Simonburn* was swung to port by *Strathcona* and hauled afloat, with No. 5 tank leaking and full of water. 8.20 p.m. *Simonburn* docked at shed 27, Saint Charles river.

November 18-19.—British steamer *Antonia* requested the service of diver, which was furnished.

November 18-21.—British steamer *Pennyworth* loaded with grain, stranded at Rivière à la Fleur, isle of Orleans, river St. Lawrence.

About 11.30 p.m. salvage steamer *Lord Strathcona* left Quebec and proceeded toward the scene of stranding.

Nos. 1 and 2 tanks were found full of water, No. 1 hold was flooded to sea level and No. 2 hold leaking.

The master stated that he intended to attempt to float his vessel on the high water that morning and requested us to stand by.

At the request of the master, the *Lord Strathcona* pulled on the ship but the attempt was unsuccessful. Grain was jettisoned from No. 1 hold. Running ice in the river prevented using motor boat.

At 11.30 a.m. engine room reported filling and motor vessel *Traverse* with additional pumps was ordered from Quebec.

Pumps were placed on board and an endeavour made to control the water. Ice conditions grew rapidly worse.

During November 20, all tanks filled, engine room flooded, and holds leaking. This condition made it necessary to remove a large part of the cargo before the ship could be safely floated.

The underwriters' representative and the owners' agent inspected the ship and viewed ice conditions.

On November 21, in conference with underwriters' representative and owners' agent, it was decided that it was impracticable to save the cargo by putting it into a ship alongside, on account of ice conditions, and that the best way to save it would be over the ice to the shore and, with their concurrence, salvage contract was cancelled.

If conditions warrant it, the vessel could be floated at much less cost and danger to gear after the ice has gone out in the spring.

November 21-23.—British steamer *Canadian Farmer*, with cargo of lumber, stranded on reef in St. Lawrence river off Three Rivers, P.Q.

About 11.15 p.m. salvage steamer *Lord Strathcona* was instructed by underwriters' representative to proceed to her assistance. Night navigation had been suspended. About 5.00 a.m. November 22, *Lord Strathcona* left Quebec and arrived at 1.15 p.m. *Lord Strathcona* ran tow line and at 3.50 p.m. the *Canadian Farmer* was hauled afloat with No. 3 tank leaking and taken to anchorage. About 4.30 p.m. tow line cast off and, as master did not require further assistance *Lord Strathcona* proceeded to Three Rivers to await daylight for return trip to Quebec.

November 24.—British steamer *Starmount* required an examination by diver while lying at shed 27, St. Charles river, Quebec.

November 25.—British steamer *Beaverdale*, with cargo, stranded on Traverse spit, east end of the Isle of Orleans, in the North Channel, St. Lawrence river. Arrangements were made with owners to assist the vessel and salvage steamer *Lord Strathcona* left Quebec at 5.20 a.m. and arrived off the vessel at 7.40 a.m. Fireboat *Citadelle* was alongside. *Lord Strathcona* hauled the ship's anchor and 75 fathoms of chain out toward the channel, water ballast was discharged; *Lord Strathcona* and *Citadelle* worked full speed on port side of the ship and, at 11.50 a.m. the *Beaverdale* swung to her anchor. Further assistance was not required.

November 28-29.—British steamer *Zenda*, with general cargo, stranded to the westward of Brulé bank lighthouse, about 28 miles down the river from Quebec. Instructions were received to assist the ship and *Lord Strathcona* sailed at 9.50 p.m. About 1.00 a.m. November 29, sighted the *Zenda* drifting in the ice, and about 2.00 a.m. *Lord Strathcona* succeeded in getting tow line to her bow. Rudder was reported to be out of commission. About 3.30 a.m. repairs to rudder were accomplished. *Lord Strathcona* cast off and broke the ice ahead of the *Zenda* and enabled the ship to drift clear of the shoals. About 7.00 a.m. *Lord Strathcona* again took *Zenda* in tow but made very little headway against ebb tide and heavy ice. About 10.30 a.m. icebreaker *Lady Grey* arrived and broke the ice ahead of *Lord Strathcona*. About 3.00 p.m. *Zenda* was delivered to the master at dock, Pointe à Carcy, Quebec.

December 2.—Norwegian steamer *Strand* left Quebec for Montreal, during the morning of December 1, in company with two other vessels escorted by an icebreaker. Vessels compelled to return to Quebec and, during the trip, the *Strand* touched bottom or struck submerged object, causing small leak in No. 5 tank. The service of a diver was requested to examine the ship's bottom.

#### PACIFIC SALVAGE COMPANY, LIMITED

##### SALVAGE OPERATIONS FOR THE YEAR ENDING DECEMBER 31, 1933.

March 12-13.—SS. *Salvage King* left Victoria for Clooose, B.C., where Seine boat *Carol M.* was ashore. On arrival found the boat broken up and beyond salvage.

March 25-April 21.—SS. *Salvage King* proceeded to Seattle, Wash., where the ss. *President Madison* had sunk at her dock while undergoing repairs. After extensive salvage operations were successful in refloating the vessel.

July 25.—SS. *Northwestern* ashore in Lynn Canal. SS. *Salvage King* left Victoria at 10.15 a.m. to proceed to her assistance but received orders to return as vessel was proceeding.

September 30-October 1.—SS. *Pacific Commerce* in distress off Tatoosh. SS. *Salvage King* proceeded to her assistance and towed her to Esquimalt, B.C.

December 21-28.—SS. *Salvage King* left Victoria at 3.00 a.m. to proceed to the assistance of the ss. *Prince George* stranded on Vadso rock, near Anyox. B.C. This vessel refloated without assistance but it was found necessary for the *Salvage King* to convoy her to Prince Rupert for dry-docking.

## SOREL SHIPYARD

REPORT OF D. B. CARSWELL, ACTING SUPERINTENDENT

The operations of the Sorel Shipyard during the fiscal year ending March 31, 1934, consisted principally in maintaining the fleet of the St. Lawrence Ship Channel Branch in good order and carrying out the necessary winter and operating repairs.

Work was also done for the Dominion steamers, the Maintenance of Lights Branch, the Maintenance of Buoys Branch and the Signal Service.

The shipyard buildings, wharves, sheerlegs, etc., were kept in good condition.

The force employed at the shipyard during the fiscal year 1933-34 varied from a minimum of 174 at July 15, 1934, and a maximum of 794 at April 15, 1933, with an average for the year of 360.

The total amount expended for shipyard operations during the fiscal year 1933-34 was \$210,034.43.

The total amount expended including operation, fleet repairs, etc., was \$864,221.08.

## RADIO BRANCH

REPORT OF C. P. EDWARDS, O.B.E., F.I.R.E., A.M.E.I.C., DIRECTOR  
NUMBER OF RADIO STATIONS IN THE DOMINION

The total number of licensed stations in operation in the Dominion and on ships registered therein was, on March 31, 1934, as follows:—

Coast Stations.....	30
Land Stations.....	1
Direction Finding Stations.....	13
Beacon Stations.....	20
Radiophone Stations.....	5
Government Ship Stations.....	53
Commercial Ship Stations.....	215
Limited Coast Stations.....	4
Aircraft Stations.....	2
Public Commercial Stations.....	22
Private Commercial Stations.....	162
Private Commercial Broadcasting Stations.....	68
Amateur Broadcasting Stations.....	6
Radiotelegraph Training Schools.....	4
Experimental Stations.....	92
Amateur Experimental Stations.....	1,606
Private Receiving Stations (including 1,517 licences issued free to the blind).....	707,625
Total.....	<u>709,928</u>

## LICENCE FEES

The fees charged in respect of radio licences issued by the Minister of Marine are as follows:—

## (i) FOR TWELVE MONTHS

1. Limited Coast Station.....	\$50 00
2. Public Commercial Station.....	50 00
3. Private Commercial Station.....	10 00
4. Experimental Station.....	5 00
5. Amateur Experimental Station.....	2 50
6. Private Receiving Station.....	2 00
7. Technical or Training School Station.....	5 00
8. Ship Station.....	10 00

## (ii) FOR SIX MONTHS

1. Private Commercial Broadcasting Station.....	\$25 00
2. Amateur Broadcasting Station.....	5 00

## GOVERNMENT COAST STATIONS

“Coast Station” is the term used to designate a radio station established on shore to communicate with ships at sea. Canada’s extensive coast line demands a large number of stations to cover all its coasts and approaches thereto. The complete system consists of sixty-nine stations located as follows:—

East Coast (includes 10 Radio Beacons).....	29
Great Lakes (includes 5 Radio Beacons).....	13
Pacific Coast (includes 5 Radio Beacons).....	20
Hudson Bay and Strait and Arctic.....	7
Total.....	<u>69</u>

The Coast station system consists of three chains, one extending from Vancouver to Prince Rupert on the Pacific, another from Port Arthur to the Atlantic ocean in the east, and the third from Port Churchill to Resolution Island at the eastern entrance to the Hudson strait, and for the purpose of administration, is divided into three divisions, Pacific Coast, Great Lakes and East Coast. The stations of the Great Lakes connect up with those of the East Coast Division, which in turn connects with the Hudson Bay Route chain. There is no direct radio connection between the Great Lakes and the Pacific coast.

Of the above stations, seventeen on the East coast and Great Lakes are operated by the Canadian Marconi Company under contract with the department, and the balance of fifty-two on the East and West coasts and Hudson bay and strait are operated directly by the department.

The primary aim of the coast station organization is to provide radio facilities whereby any ship within 500 miles of the Canadian coast can establish instant communication with the shore. Constant watch, 24 hours a day, 365 days a year, is maintained at practically all of the stations, which during the year handled a total of 6,693,720 words.

## RADIOTELEGRAPH AIDS TO NAVIGATION BROADCAST

Twice daily, at advertised hours, ten stations on the East coast, seven on the Great Lakes and one on the West coast broadcast information to navigators covering weather forecasts, position and nature of dangers to navigation, etc. In addition, urgent information, such as hurricane warnings, etc., is broadcast immediately upon receipt. Two stations in the Hudson bay and strait also broadcast weather forecasts.

Details of the times of transmissions, call signals, wavelengths, etc., are given in the current “Notice to Mariners” in this reference.

## RADIOTELEPHONE AIDS TO NAVIGATION BROADCAST

A comprehensive radiotelephone broadcast service to fishermen is in operation on the East coast.

Three stations are used for this purpose: Louisburg (VAS), Sambro Lightship (VGX), and Saint John, N.B. (CHSJ).

Louisburg, using a 4,000 watt radiotelephone transmitter, broadcasts on 680 Kc/s (441.2 metres) at 12 noon and 11 p.m., E.S.T., daily a message to fishermen which includes weather forecasts, storm warnings and a synopsis of information in regard to the market price of fish, the amount of bait on hand at various points, and any other outstanding items of interest to fishermen generally. The range of this station enables fishermen to receive these messages as far east as the Grand Banks.

The Sambro Lightship, VGX, broadcasts on 690 Kc/s (434.8 metres) at 7 a.m. and 12.30 p.m., E.S.T., daily, and transmits the same message as Louisburg; it has a range of approximately 150 miles.

Station CHSJ, Saint John, broadcasts weather forecasts and storm warnings to fishermen in the Bay of Fundy on 1210 Kc/s (248 metres) at 5 a.m. and 7 a.m. E.S.T., daily.

This service is augmented during the summer months by the C.G.S. *Arras* (CGFD), which accompanies the fishing fleet and broadcasts by radiotelephone on 690 Kc/s (434.8 metres) storm warnings and weather forecasts at 6 a.m., E.S.T., daily, and a message to fishermen the same as that of Louisburg at 2 p.m., E.S.T., daily, with a range of approximately 150 miles.

The transmission from this network of stations provides reception at any point along the Atlantic seaboard as well as on the banks fished by Canadian vessels.

## SPECIAL BROADCASTS IN SUB-ARCTIC REGIONS

In December, 1930, arrangements were made for the department's stations at Coppermine, Coronation gulf; Chesterfield inlet and Port Churchill, Hudson bay; and the Royal Canadian Mounted Police schooner *St. Roch* to broadcast at scheduled hours for the benefit of trading posts, settlers, miners, missions, etc., within range. The broadcasts which consist of press, personal messages, etc., are transmitted by voice in accordance with the following schedule:—

Station	Call letters	Wavelength		Time (E.S.T.) and day
		Kc/s	Metres	
Coppermine.....	VBK	571	525	11.05 p.m. Wednesday and Saturday.
Chesterfield Inlet.....	VBZ	555	540.5	10.00 p.m. Tuesday and Friday.
Port Churchill.....	VAP	555	540.5	11.00 p.m. Monday and Thursday.
St. Roch.....	VGSR	667	450.0	11.00 p.m. Wednesday and Saturday.

## PRESS

*West Coast*

Press messages are transmitted as follows:—

Vancouver (VAI) at 0500 G.M.T., on 8330 Kc/s (36 Metres).

Estevan (VAE) at 0900 G.M.T., on 171 Kc/s (1750 Metres).

## TIME SIGNALS

Time signals are transmitted as follows:—

*East Coast*

Chebucto Head (VAV)—Daily, except Sunday, at 2 p.m., G.M.T., on 400 Kc/s (750 Metres).

## West Coast

Victoria Radio (VAK)—Twice daily, at 0300 and 1800 G.M.T., on 405 Kc/s (740 Metres).

Estevan (VAE)—Twice daily, at 0300 and 1800 G.M.T., on 500 Kc/s (600 Metres).

## INVESTIGATION OF ICE CONDITIONS—CABOT STRAITS, GULF OF ST. LAWRENCE

The investigation of ice conditions in the Cabot straits at the opening of navigation was again undertaken this year by the icebreakers *N.B. McLean* and *Montcalm*, and commenced on April 1.

The ships cruise in the vicinity of Cabot straits observing the ice conditions and the senior ship, every few hours, obtains from all incoming and outgoing ships, and from all radio and signal stations, a detailed report on the ice conditions in the different areas. These, in conjunction with her own observations, are compiled and analyzed, and, based thereon, a broadcast message containing a synopsis of location and drift of the ice, together with recommendations as to the best route for ships to follow, is broadcast four times daily, the ship using the general call sign VCQP.

The coast radio stations at Chebucto Head (VAV), North Sydney (VCO) and Grindstone (VCN), are prepared to pass copy of this message to ships requesting it.

In addition, the following stations broadcast a brief summary of the above-mentioned message:—

Station	Time (G.M.T.)	Wavelength
Louisburg—VAS.....	04-00	107 Kc/s C.W. (2,804 metres) following weather forecasts.
	16-00	
Cape Race—VAZ.....	04-20	
	16-20	455 Kc/s (660 metres).

Every vessel spoken is advised of the location and nature of the ice she may expect to encounter on her particular course, and the best route to follow. The total number of words handled by these ships this year was:—

<i>N.B. McLean</i> .....	66,733
<i>Montcalm</i> .....	37,306
	104,039

The Patrol was discontinued on May 8, 1933.

## HUDSON STRAIT—DEPOT SHIP

The departmental steamer *N.B. McLean* acted as depot ship in the Hudson strait throughout the season of navigation.

She is completely equipped with radio, both telegraph and telephone, and maintains constant watch on 500 Kc/s (600 metres). Call Sign CGSN. Short wave schedules are also maintained direct with the Ottawa Short Wave Station VAA. The radio traffic handled by the ship this year totalled 82,612 words.

She was the first vessel to enter the Hudson strait from the Atlantic, having left Quebec on July 10, arriving at Resolution Island on July 17. On her return voyage, she left the western end of Hudson strait on October 5, visiting the Direction Finding Stations en route, finally leaving the eastern entrance to the strait for Quebec on October 11, at which port she arrived on October 16, 1933

## RADIO DIRECTION FINDING

Thirteen Direction Finding Stations, 7 on the East coast, 5 on the Hudson bay and strait and 1 on the West coast are in operation. With the exception of St. Paul Island, the East and West coast stations maintain "constant watch" throughout the year, and the Hudson bay and strait stations maintain a similar

watch during the season of navigation only. The St. Paul Island station operates as a Direction Finding station maintaining twenty-four hour watch during periods in the spring and fall only when the normal route of traffic to and from the gulf of St. Lawrence is via Cabot strait. During the remainder of the year the station functions as an automatic radio beacon, but is available to give bearings upon special request being made through the North Sydney coast station. These stations give bearings to any ships fitted with radio, free of charge.

The Canadian Direction Finding Stations continue to enjoy a good reputation for efficiency and accuracy, many comments on the same having been received from navigators.

The number of bearings given by the stations varies from month to month, being dependent on weather conditions.

## BEARINGS GIVEN 1933-34

Station—	
Chebucto Head, N.S.	10,020
Canso, N.S.	7,507
Yarmouth, N.S.	12,989
St. Paul Island, N.S.	2,786
Cap Race, Nfld.	6,795
Saint John, N.B.	1,243
Pachena Point, B.C.	2,119
Belle Isle, Nfld.	1,250
Port Churchill, Hudson Bay	162
Nottingham, Hudson Strait	151
Cape Hope's Advance, Hudson Strait	208
Resolution Island, Hudson Strait	284
	45,514

## RADIO BEACON SERVICE

There are now approximately 1,050 ships fitted with radio direction finding apparatus plying to and from Canadian ports.

The radio beacon system of the department comprises twenty stations, located as follows:—

<i>Atlantic Coast and Gulf of St. Lawrence</i>	Cape Ray, Nfld. Sambro Lightship Seal Island, N.S. Lurcher Lightship	Michipicoten Island Cove Island
Cape Bauld, Nfld. Cape Whittle, P.Q. West Point, Anticosti Isl. Perroquet Island Pointe-des-Monts, P.Q. * St. Paul Island Heath Point	<i>Great Lakes</i> South East Shoal Main Duck Long Point	<i>Pacific Coast</i> Race Rocks, Vancouver Isl. Langara Dead Tree Point Quatsino (Kains Island) Triple Island

\* This station operates as a Radio Beacon except during the spring and fall when the normal route of traffic to and from the gulf of St. Lawrence is via the Cabot strait, when the station functions as a Direction Finding station.

In addition to the above radio beacon facilities, ships equipped with direction finding apparatus may obtain signals for the purpose of taking bearings from any of our coast stations free of charge; during the past year 2,740 requests for such signals were handled.

## COMMERCIAL SHIP SERVICE

Each of the regular thirty coast stations handles commercial traffic to and from ships and in addition all of the Direction Finding Stations, Cape Race, Belle Isle, Canso, Yarmouth, Chebucto Head, Saint John, Port Churchill, Chesterfield Inlet, Nottingham Island, Cape Hope's Advance, Resolution Island and Pachena, combine commercial service with their direction finding work.

Long distance service to ships on the Atlantic is provided by the licensed station at Louisburg, N.S., owned and operated by the Canadian Marconi Company, and on the Pacific by the departmental stations at Estevan and Vancouver (VAI). The traffic returns from these stations indicate that the route of commercial traffic continues to shift from the low power medium wave coast stations to the high power long and short wave stations.

#### RADIOTELEPHONE SERVICE TO SMALL CRAFT ON THE PACIFIC COAST

The radiotelephone system has completed another year's work and is being used to a gratifying extent. The shore telephone stations are located at Vancouver, Merry Island, Alert Bay, and Cape Lazo.

In addition, the four-life-saving radiotelephone stations on the west coast of Vancouver island at Bamfield, Cape Beale, Pachena Point and Carmanah, are available for this service. Approximately, forty-eight tugs and other small craft are now equipped with radiophone apparatus. The sets in these boats are operated by the captain or engineer and most of them are installed by an operating company on a rental basis which includes service. The number of paid radiotelephone calls handled numbered 13,278.

#### SHIP'S EMERGENCY APPARATUS

The department has in effect an arrangement whereby its coast stations call upon Canadian and certain British ships to operate their emergency apparatus whilst at sea, in order to check their efficiency.

#### NUMBER OF SHIPS EXERCISED, 1933-34

Total.....	258
Failures.....	Nil
Average time taken to change over.....	11.5 secs.
Time allowed.....	30.0 secs.

#### AUTO ALARM DEVICES

There are now approximately 368 ships fitted with auto alarm devices plying to and from Canadian ports, all of which were inspected during the year and found in efficient working order.

One of these devices approved by the department is now being installed on certain vessels of Canadian registry.

This equipment consists of a valve receiver sharply tuned to 500 Kc/s (600 metres), whose function it is to pick out the auto alarm signal—12 dashes, each of four seconds' duration, interspersed by a space of one second—from all other signals and pass it to a timed electro-mechanical device called the selector, which in turn actuates three bells installed at strategic points on board the receiving ship, indicating to those on board that a vessel is in distress and requires assistance.

#### INSPECTIONS

The administration of the Radiotelegraph Act has been carried on as usual and no evasions or attempted evasions of section 7 of the Act (Revised Statutes of Canada, 1927, chapter 195) calling for compulsory equipment of radiotelegraph apparatus on board passenger steamers, have been reported.

Permanent inspection establishments are maintained at Victoria, Vancouver, Calgary, Edmonton, Regina, Moose Jaw, Saskatoon, Winnipeg, Fort William, Toronto, Hamilton, London, Kitchener, Windsor, Ottawa, Kingston, North Bay, Montreal, Quebec, Sherbrooke, Saint John, and Halifax.

Inspectors in addition to inspecting all ships and licensed stations in their district, also undertake the examination of operators for Certificates of Proficiency. All land stations are inspected at least once a year, and all ships when they visit Canadian ports.

The policy of utilizing the services of qualified radio operators as "Part Time" inspectors to look after small localities or areas and to assist permanent inspectors in the large centres continues to prove satisfactory. These "Part Time" inspectors are paid a nominal salary of \$15 to \$30 per month, and are located at the following points:—

*Nova Scotia.*—Yarmouth, Glace Bay, Sydney, and Sydney Mines.

*Prince Edward Island.*—Charlottetown and Summerside.

*New Brunswick.*—Moncton and Fredericton.

*Quebec.*—Montreal, St. Lambert, Three Rivers and Riviere-du-Loup.

*Ontario.*—Brantford, Fort William, Port Arthur, Toronto (2), Windsor, Chatham, Fort Frances, Kenora, Oshawa, St. Catharines, Niagara Falls, and Gananoque.

*Manitoba.*—Brandon and Winnipeg.

*Saskatchewan.*—Prince Albert.

*Alberta.*—Medicine Hat.

*British Columbia.*—Kamloops, Nelson, and Prince Rupert.

*Yukon.*—Dawson.

The number of inspections carried out during the fiscal year was:—

Coast and Land stations.....	343
Ship stations.....	2,341
Amateur Experimental and Private Receiving stations.....	45,186
Total.....	47,870

#### EXAMINATIONS FOR CERTIFICATES OF PROFICIENCY IN RADIOTELEGRAPHY

The International Radiotelegraph Convention prescribes the qualifications of radio operators on mobile stations, and departmental regulations provide that all commercial and amateur operators must pass examination to satisfy the Minister as to their ability to operate the class of station on which they are engaged.

Competent operators on mobile stations are demanded in the interests of safety of life at sea, while interference problems necessitate similar requirements in the operation of amateur and land stations.

The more important services call for operators holding First, Second, or other prescribed Class of Certificate of Proficiency, while in the case of services of lesser importance not likely to become a source of interference, operators are required to satisfy the department that they are fully qualified to operate and maintain the equipment upon which they are employed.

Two hundred and fifteen operators were examined for Commercial Certificate of Proficiency in Radio during the year, including eighty-four re-examinations; seventy-three candidates were successful and one hundred and forty-two failed. Twenty-two First Class Certificates issued under the Convention of 1912 were exchanged for Second Class Certificates issued under the Convention of 1927 without further examination.

Two First Class and two Second Class Certificates of Proficiency in Radiotelegraphy issued under the Convention of 1927 were exchanged for Certificates of similar class issued under the Madrid Convention, 1932.

Eleven candidates for Provisional Certificates of Proficiency in Radiotelephony were examined of whom eight were successful and three failed. Four Provisional Certificates of Proficiency in Radiotelephony were renewed during the year. Five candidates for Restricted Provisional Certificates of Proficiency in Radiotelephony were also examined all of whom were successful.

Five hundred and seventy-six candidates for Amateur Radio Certificates were also examined, of whom five hundred and forty-two were successful and thirty-four failed.

Four thousand seven hundred and fifty-eight Certificates of Proficiency in Radio have been issued by the Department up to the end of March, 1934.

#### FEEES FOR EXAMINATIONS

First Class Certificate.....	\$2 50
Second Class Certificate.....	1 00
Third Class Certificate.....	1 00
Experimental Certificate.....	2 50
Amateur Certificate.....	0 50
Emergency Certificate, any class.....	5 00
Radiotelephone Certificate.....	2 50

#### RADIO BROADCASTING

The Canadian Radio Broadcasting Act, 1932, empowers the Canadian Radio Broadcasting Commission to regulate and control broadcasting in Canada. On the commission's recommendation, licences for broadcasting stations are issued by the Minister of Marine. Seventy-two licences were issued during the year.

Under an arrangement with the commission, and on its behalf, inspectors of the Department of Marine make observation and report violations of the commission's rules and regulations.

The total number of licences issued for receiving sets was 707,625, and the net revenue from Broadcasting, Transmitting and Receiving Licence fees, after deducting commissions to licence issuers, and to the Post Office Department for the sale of licences, amounted to \$1,294,399.65.

#### TRANSATLANTIC RADIOTELEPHONE SERVICE

A direct Anglo-Canadian radiotelephone circuit is now available to the Canadian public through the facilities of the Canadian Marconi Company, the Bell Telephone Company and the British Post Office.

#### COMMERCIAL RADIOTELEPHONE SERVICE BRITISH COLUMBIA

The heavy cost of construction and maintenance of regular telephone lines along the coast of British Columbia has resulted in a service being developed by the North West Telephone Company, a subsidiary organization of the British Columbia Telephone Company, whereby long distance radiotelephone service to points hitherto telephonically isolated is being provided.

Under licence from this department, this company has established permanent public Commercial Radiotelephone stations at Ocean Falls, B.C., Campbell River, B.C., Prince Rupert, B.C., Prince George, B.C., and Anyox, B.C.

Used in conjunction with ordinary telephone exchanges persons residing at the above points are thus provided with telephone facilities to outside points.

Licences are also issued to this company to operate private Radiotelephone stations for the purpose of providing outside telephonic facilities for industrial concerns at Claydon Bay, B.C., and Sage Creek, B.C.

With a view to extending this service, the North West Telephone Company are carrying out further tests under licensed Experimental stations at Powell River, B.C., Campbell River, B.C., Vancouver, B.C., and also a portable station for use anywhere in British Columbia.

TRAFFIC SECTION

This section of the Radio Branch handles the preparation, rendering and collection of accounts for commercial ship to shore and inter-station messages, handled by the departmental ships and stations and the auditing, rendering and collection of international accounts to various operating companies and foreign administrations for radiotelegrams exchanged by foreign ships through Canadian coast stations and by Canadian ships through foreign coast stations. The number of accounts handled by the branch was 75,500, representing \$83,000 in tolls.

MESSAGES HANDLED BY THE COAST STATION SERVICES

The total number of messages and words handled during the year ending March 31, 1934 (including retransmissions) was as follows:—

	Messages	Words
East Coast.....	109,007	2,491,809
Great Lakes.....	19,193	286,233
West Coast.....	152,939	3,024,257
Hudson Bay and Strait.....	25,355	891,421
	<u>306,494</u>	<u>6,693,720</u>

The business handled by the East Coast System (operated by the Canadian Marconi Company under contract and partly by the department) shows an increase of 2,031 messages with an increase of 155,624 words.

The Great Lakes System (operated by the Canadian Marconi Company under contract) shows a decrease of 906 messages with a decrease of 51,021 words.

The West Coast System (operated by the department) shows an increase of 10,775 messages with an increase of 98,978 words.

The Hudson Bay and Strait System (operated by the department) shows a decrease of 4,875 messages with a decrease of 203,117 words.

REVENUE

The net revenue accruing to the Radio Branch from all sources during the year amounted to \$1,353,258.79 against \$1,460,532.10 in 1932-1933, a decrease of \$107,273.31.

<i>Traffic Revenue—</i>	
East Coast.....	\$ 8,283 63
Great Lakes.....	672 25
West Coast.....	33,476 37
Hudson Bay and Strait.....	2,172 43
Premium Revenue.....	4,476 71
	<u>\$ 49,081 39</u>
<i>Other Revenue—</i>	
Licence fees.....	\$1,303,558 40
Examination fees.....	619 00
	<u>\$ 1,304,177 40</u>
	<u>\$ 1,353,258 79</u>

The East Coast traffic revenue shows a decrease of \$388.67, the Great Lakes an increase of \$303.23, the West Coast an increase of \$1,528.54, the Hudson Bay and Strait a decrease of \$649.17, and the Premium revenue an increase of \$2,600.66. Total net traffic increase, \$3,394.59.

The licence fees show a decrease of \$110,738.40 and the examination fees an increase of \$70.50. Total net "Other Revenue" decrease, \$110,667.90.

#### TRANSATLANTIC

The Marconi Beam Service between Drummondville, P.Q., and Bodmin, England, which was inaugurated on October 25, 1926, continues in permanent operation. The rates in effect via this circuit are as follows:—

##### CANADA EASTERN ZONE TO GREAT BRITAIN AND IRELAND

Fully paid messages.....	\$0 18 per word.
Code messages.....	0 11 per word.
Deferred messages.....	0 08 per word.
Nightletter messages.....	1 50 for 25 words or less and 6 cents for each extra word.
Post letter messages.....	0 60 for 20 words or less and 3 cents for each extra word.

#### TRANSPACIFIC

The Marconi Beam Service between Drummondville, P.Q., and Ballan, Victoria, Australia, which was inaugurated on June 16, 1928, continues in permanent operation. The rates in effect via this circuit are as follows:—

##### CANADA TO AUSTRALIA

Fully paid messages.....	\$0 35 per word.
Code messages.....	0 21 per word.
Deferred messages.....	0 17½ per word.
Day letter messages.....	2 92 for 25 words or less and 11½ cents for each extra word.

#### HUDSON BAY ROUTE

Detailed observations covering navigation conditions in the Hudson bay and strait during the season of navigation 1933, were made and have been compiled in pamphlet form, copies of which may be procured from the department.

#### COMMUNICATION WITH ISOLATED POINTS

The importance of radio as a means of maintaining contact with isolated points beyond the reach of existing telegraph and telephone facilities is emphasized by the fact that 35 licences were issued to companies and private individuals for stations of this class.

Emergency communication in the case of interruption of normal telegraph and telephone communication has been provided for by the issuance of 31 licences to public utilities and power companies for the establishment of radio stations at their power plants and distribution centres.

#### FLIGHTS OF AIRCRAFT

##### *Rome to Chicago Flight of Italian Planes:*

An extensive organization was set up by the department to render all possible assistance to the Italian air squadron which left Rome on July 1, 1933, bound for Chicago under the command of General Balbo.

Twenty-four planes arrived at Reykjavik on July 5, and until their arrival at Shediac, N.B., on July 13, hourly weather reports from Coast, Direction Finding and Radio Beacon Stations along the route were collected and forwarded to General Balbo, together with reports of upper air observations which were taken by the Belle Isle and Cape Race Coast Stations.

The East Coast Radio Stations were successful in keeping in close contact with the planes by radio and visual observations during their flight over Canadian territory, which resulted in those associated with the flight being kept fully informed of the movements of the squadron.

The same procedure was followed on the return flight of these planes, which arrived at Shediac, N.B., on July 25, 1933, and left the following morning for Shoal Harbour, Newfoundland, en route to Italy.

#### *Lindbergh Plane:*

Upon arrival of this plane at Halifax, N.S., from the United States on July 1, 1933, arrangements were made for Colonel Lindbergh to receive bearings and weather reports from our East Coast Radio Stations. These stations maintained contact with the plane by radio during her flight over Canadian and Newfoundland territory.

#### *French Plane F.A.L.C.C.:*

Piloted by Messrs. Rossi and Codos the plane F.A.L.C.C. left New York for France on August 5, 1933. While passing within range of our East Coast Radio Stations, direction finding bearings and weather forecasts were given to this plane.

### WORK UNDERTAKEN ON BEHALF OF OTHER DEPARTMENTS OF THE GOVERNMENT

#### *Royal Canadian Mounted Police*

Prior to sailing on an extended cruise to the Western Arctic, the R.C.M.P. auxiliary schooner *St. Roch* was fitted with long and short wave transmitting and receiving apparatus in order to maintain contact with its headquarters.

This branch also operates and maintains the radio equipment of the Preventive cruisers *Baroff*, *Bayhound*, *Fleur-de-lis*, *Preventor*, *Patrol Boat No. 4*, *Una*, *Adversus*, *Alachasse*, *Madawaska*, *Chaleur*, and *Scatarie*.

#### *Department of Railways and Canals*

The radio equipment of the tug *Ocean Eagle*, based on Port Churchill harbour, is maintained and operated for the Railways Department by this branch.

#### *Department of Fisheries*

The radio installations of the Fisheries Patrol steamers *Givenchy* and *Malaspina* on the West coast, and *Arras* and *Arleux* on the East coast are maintained and operated for the Fisheries Department by this branch.

### OTHER DEPARTMENTS OF CANADIAN GOVERNMENT OPERATING STATIONS

#### *Department of National Defence*

Five permanent stations situated as follows: Winnipeg, Man., Camp Borden, Ont., Ottawa, Ont., Toronto, Ont., and Kingston, Ont.

The Royal Canadian Corps of Signals of the above department operates, in addition to its purely military activities, stations on behalf of the following departments and civil activities of the Department of National Defence:—*Interior Department (Northwest Territories and Yukon Branch)*.—Fourteen permanent stations and one summer station situated along the McKenzie River and in the Yukon Territory.

*National Defence Civil Government Air Operations.*—Five summer stations on the East coast and Maritimes in connection with the Royal Canadian Mounted Police Preventive Service.

*National Defence Civil Aviation Branch.*—One permanent station situated at St. Hubert Airport, Montreal and the western directive radio beacon stations established in connection with air mail operations at Forrest, Man., Regina, Sask., Maple Creek, Sask., Lethbridge, Alta., and Red Deer, Alta.

#### LEGISLATION

Bill J, an Act respecting shipping, was introduced in the Senate last year. This Bill contained a complete revision of the Canada Shipping Act and included all the provisions now included in the Radio-telegraph Act and the Safety of Life at Sea and Load Line Conventions Act, in regard to the establishment and operation of radio in ships.

The draft Bill was referred to the Banking and Commerce Committee of the Senate, but was not finally dealt with by the end of the session.

It was reintroduced in the Senate this session (1933-34) as Bill E, and it is possible that the same will be finally dealt with by both Houses of Parliament this year.

#### INDUCTIVE INTERFERENCE SECTION

Considerable progress has been made in the work of this section during the fiscal year. The new equipment supplied during the previous year has proved to be of great benefit, and inspectors are becoming more expert in its use. New offices have been opened at Fort William, Kingston, North Bay and Sherbrooke, and eight additional cars have been added to the fleet.

Thirty-two cars are equipped for the investigation of interference and operate from the permanent offices at Vancouver, Calgary, Edmonton, Regina, Saskatoon, Moose Jaw, Winnipeg, Toronto, Hamilton, London, Kitchener, Windsor, Kingston, North Bay, Fort William, Ottawa, Montreal, Quebec, Sherbrooke, Halifax and Saint John, N.B.

Twenty-six part-time inspectors, located in other cities and towns throughout the Dominion, are supplied with portable receivers and a limited amount of equipment for the investigation of interference in their districts.

The work of the investigators is carried out along the same general lines as in the past and progress continues to be made in the development of investigation equipment and the improvement of investigation methods, in order to cope with changing conditions brought about by the improved sensitivity of modern broadcast receivers. Although the noise level of interference in most districts has been considerably reduced by the elimination of many sources and the improved co-operation extended by the public utilities and users of electrical apparatus, the demand for the services of our investigators remains as great as before.

The inspector in charge of each car, with his assistant, investigates interference in the city in which his headquarters are located, and, also, makes regular interference investigation tours throughout the sections of the surrounding country which are under the jurisdiction of the office to which he is attached.

The investigators, on their tours, interview broadcast listeners who have reported interference and determine the electrical system on which the trouble originates; they then assist the owners of the system to locate the exact source and recommend means of suppressing the interference. Many of the sources are found to be faults or abnormal conditions in electrical apparatus, which, if not attended to in the early stages, may result in hazardous conditions or service interruption.

Where interference is found to be caused by the normal operation of electrical equipment, the investigator demonstrates the use of interference suppressors and recommends, in detail, what steps the owners should take to permanently cure the trouble.

Since practically every piece of electrical apparatus is a potential source of radio interference, Radio Branch investigators are daily confronted with new problems peculiar to the specific equipment under investigation. For many of these cases no precedent exists. Detailed records of the technical features covering location and suppression of interference from such sources are, therefore, made for future guidance.

In addition to investigation of interference, the investigators do other work required by the Radio Branch in towns they visit. Such work includes the sale of radio receiving licences, inspection of amateur stations and the examination of candidates for operators' certificates.

The following table gives a summary of the sources of radio interference investigated during the past four years:—

	1930-31	1931-32	1932-33	1933-34
SOURCES INVESTIGATED				
Electrical distribution systems and power lines.....	7,719	7,688	7,294	7,904
Domestic and commercial electrical apparatus.....	3,763	3,385	2,808	2,683
Defective receivers and radio apparatus.....	1,346	1,605	1,594	1,614
	12,828	12,678	11,696	12,201
ACTION TAKEN				
Number of sources definitely reported cured.....	10,709	11,082	10,142	10,592
Number of sources not yet reported cured.....	1,953	1,467	1,401	1,424
Number of sources having no economic cure.....	166	129	153	185
	12,828	12,678	11,696	12,201

The Radio Branch handles a large number of complaints incidental to these individual sources, since many broadcast listeners frequently request assistance relative to a single disturbance on a distribution network. Some of these individual sources seriously affect reception for many miles in all directions.

Many of the 1,424 sources listed as not yet reported cured have been successfully dealt with by the owners of the apparatus following the advice given by the investigators, but definite reports of the permanent elimination have not been received.

The 185 sources reported as "having no economic cure" are principally electro-medical apparatus, electric railway systems, high-voltage power lines and a few other types of commercial apparatus.

The question of interference from electro-medical apparatus is receiving serious consideration but the elimination of same presents a more difficult problem than that of other sources of interference, owing to the extended area of direct radiation.

The only known effective method of suppressing the direct radiation is by having the equipment operated within a metal screen cabinet large enough to accommodate both the operator and the patient. The inductive effect can then be dealt with by installing suitable interference suppression devices in all conductors entering the cabinet. The interference from a single piece of electro-medical apparatus in a residential district may affect all broadcast listeners in the locality.

The investigation of street railway interference is progressing and much of the preventable interference from railway systems has been reduced in Halifax and Quebec city. Improved types of suppressors have recently been developed and will shortly be tried on the electric railway systems in several cities.

During the year, our investigators connected surge traps to 1,219 pieces of electrical apparatus, to demonstrate means of suppressing the interference. Most of these cases required a series of tests to determine a suitable arrangement of the suppression devices.

In addition to the sources listed above, a great number of cases have been dealt with by correspondence from headquarters and district offices. Following the advice given, the interference has been successfully eliminated by the owners of the apparatus.

The greatest improvement to the equipment during the year has resulted from a development by the Radio Branch staff of an absolute direction finding or "sense" feature which has been added to the receivers in the interference cars, and which has proved of great value in locating sources, particularly faults on transmission lines. Many such faults cause interference to be radiated from the transmission line for a distance of 10 or 15 miles along the line. Previously, the radio receiver was connected to a loop antenna which was rotatable and gave the general direction of the interfering surge, i.e. it would indicate if the interference were travelling in the east-west or north-south direction. The new absolute direction finding equipment now installed in our newest cars will indicate whether the interference originates on the power line to the east or to the west, or north, or south, as the case may be. This feature has enabled our investigators to locate faults on power lines within a few hours, whereas without this sense feature such investigation would probably require much patrolling of the lines and would involve carrying a portable receiver considerable distances where the line was remote from the roadway. The sense feature has also enabled the investigators to distinguish between faults originating at a power house and those originating on the power line. Several faults have, in this way, been located in the power houses and cleared, thus, eliminating interference, which, in the past, was attributed to an incurable condition of the line.

In February, 1934, Supplement "A" to Bulletin No. 2, "Radio Inductive Interference" was published. This supplement is used by our investigators as an instruction manual and it is very much appreciated by power companies and others in Canada who co-operate with us in the suppression of interference. Appreciative letters have also been received from foreign engineers with whom an exchange of technical information is regularly carried on. Much of the improved equipment described in this bulletin is an advance on any equipment previously described.

#### NEW CONSTRUCTION, ADDITIONS AND ALTERATIONS

The buildings, masts, rigging and equipment at all stations were maintained in reasonably good condition. Certain urgent repairs to buildings and masts have, however, been deferred due to considerations of economy. In these cases temporary repairs have been undertaken to make same serviceable for another year.

#### *East Coast (Government Operated)*

*St. Paul Island.*—A new type ABT 3 beacon transmitter, complete with control panel, was installed replacing the original spark equipment which has been retained as a spare. The 60 cell 240 ampere hour main storage battery was overhauled and new positive plates installed.

The station now normally operates as an automatic radio beacon, but arrangements are in effect whereby it reverts to D.F. operation for short periods at the opening and also closing of St. Lawrence navigation.

*East Coast (Marconi Operated)*

*Fame Point.*—Major repairs to building were completed.

*Point Amour.*—A new transmitter of the radio beacon type ABT 3, complete with control panels, was installed replacing obsolete spark equipment. A new Kohler 2 K.W. generating plant was installed to furnish power for this transmitter.

One of the two original spark equipments was removed, the other being retained as a spare.

*Sable Island.*—The top gallant mast, which was in an unsafe condition, was dismantled together with its stays and repairs were made to the remaining rigging.

*West Coast (Government Operated)*

*Cape Lazo.*—Arrangements were made for the B.C. Telephone Company's service after the evening closing of the Government Telegraph office at Courtnay.

*Gonzales Hill.*—A 100 Watt valve type emergency transmitter was installed replacing obsolete spark emergency equipment. Continuous service via short wave was inaugurated between Gonzales and Digby Island for the handling of coast traffic.

*Point Grey.*—A new short wave receiver was installed.

*Northern Stations*

*Chesterfield.*—This station was equipped to provide D.F. bearings. A Bellini Tosi type aerial is suspended from a triatic between the original masts. The D.F. receiver is a Marconi type MDF 3.

*Great Lakes (Marconi Operated)*

*Sault Ste Marie.*—The construction of a water main to the station was completed, this giving an adequate domestic supply and increased fire protection.

*Vessels, Department of Marine*

Radio equipment on Canadian Government steamers owned by this department have been periodically overhauled during the year and all apparatus has been maintained in satisfactory condition.

## FREQUENCY MONITORING

The narrow frequency tolerances permitted by international agreements compel the signatory administrations to maintain control stations for the purpose of making frequent and accurate measurements of the frequencies of all stations under their jurisdiction.

The frequency monitoring station established in Ottawa by the branch in 1931 under authority of P.C. 209 (February 5, 1931) has been moved during the year to new quarters in a building situated at the Dominion Experimental Farm. The improvement in reception conditions, due to a much lower level of inductive interference at the new location, has resulted in increased efficiency.

The equipment of the station comprises an absolute standard of frequency referred directly to time through the agency of a synchronous clock located at the Dominion Observatory and driven by 1000 cycle current derived from the frequency standard. This clock is compared daily with the national time standards by the observatory staff.

The order of constancy of this standard is such that the accuracy with which its frequency may be determined is limited solely by the accuracy with which the mean solar day is determined by the observatory.

Comparisons of our frequency standard with that maintained for the United States by the Bureau of Standards at Washington, have been carried out by means of simultaneous measurements in Ottawa and in Washington of a highly stable 5000 KC/s emission, which is made by the Bureau of Standards at regular periods. The results of these measurements show the two standards to be in agreement within 5 parts in 10 million.

The equipment of the station is completed by a series of six highly sensitive and selective receivers covering the frequency spectrum from 85 KC/s to 25,000 KC/s, together with the auxiliary interpolation equipment necessary to effect the comparison of the received frequencies with the standard.

Approximately one hundred Canadian and foreign stations operating in all parts of the frequency spectrum and engaged in various commercial government, and broadcasting services are being checked regularly.

Whenever our measurements on foreign stations have indicated deviations from assigned frequencies in excess of the deviations permissible under the International Telecommunications Convention, such deviations have been brought to the attention of the foreign administrations concerned.

A weekly report of the measurements taken on Canadian Broadcasting Stations heard during the week is forwarded to the Canadian Radio Broadcasting Commission for their information.

SPECIAL ASSISTANCE RENDERED TO SHIPS DURING THE YEAR BY GOVERNMENT  
RADIO STATIONS

*West Coast*

*Digby Island*

SS. *Prince George*.—At 10.48 p.m. on December 20, 1933, the Digby Island Station received a distress message from the ss. *Prince George*, advising ashore Vadso rock, approximately 4 miles from Anyox, Portland canal, in snow storm. The agents of the Canadian National Steamships, Pacific Salvage Co. and Lloyds at Prince Rupert, were notified immediately. At 2.46 a.m. on the 21st the *Prince George* advised passengers and baggage landed by lifeboats, ship abandoned, Nos. 1 and 2 holds filling and ship listing. The steamers *Prince John* and *Salvage Princess* were dispatched from Prince Rupert and the U.S.C.G. *Alert* proceeded from Ketchikan to assistance. The *Prince George* was refloated at high tide and proceeded to Anyox under her own steam.

The West Coast stations were also of assistance to the ss. *Pacific Commerce* and *Losmar*.

*Great Lakes*

The Great Lakes stations were of assistance to the ss. *D. E. Callender*, *George M. Cox*, and barge *Peter B. Campbell*.

*East Coast*

*Chebucto Head, N.S. Direction Finding*

SS. *Concordia*.—At 19.15 G.M.T. on March 5, 1934, the Chebucto Head Station received a distress message from the ss. *Concordia* advising position 43°11' N 59°11' W, in collision with ss. *Black Eagle*. At 19.49 G.M.T. the ss. *Black Eagle* standing by *Concordia* who informed the ss. *Ascania* and other vessels their assistance not required. At 20.17 G.M.T. the *Black Eagle* reported three boats from *Concordia* coming alongside and at 20.27 G.M.T. all crew from *Concordia* on board. The *Concordia* was abandoned in a sinking condition.

Schooner *Ruth and Margarethe*.—At 19.32 G.M.T. on July 23, 1933, the Chebucto Head Station received a message from the Master of the ss. *Griehiem* reading as follows: "Schooner *Ruth and Margarethe* in 44.10 north and 61.40 west lost propeller is steering a northwest course and asks for aid." Chebucto Head immediately broadcast this information.

Schooner *Shirley B. Corkum*.—At 18.34 G.M.T. on December 6, 1933, the Chebucto Head Station received a message from the Master of the Schooner *Shirley B. Corkum*, relayed by the ss. *Olga S*, addressed Marine and Fisheries, Halifax, reading as follows: "Please send government boat for Schooner *Shirley B. Corkum*, broken shaft, Lat. 44.34 Long. 60.56, steering west." The C.G.S. *Arleux* picked up the *Corkum* 20 miles southeast of Sambro on December 8th and towed her to Lunenburg.

#### *Grindstone, Magdalen Islands*

SS. *Fernmoor*.—At 6.43 p.m. E.S.T. on December 9, 1933, the Grindstone Station received a distress message from the ss. *Fernmoor* advising ashore off Cape Anguille, Nfld., and requesting that some ship stand by immediately. At 6.45 p.m. Grindstone broadcast this information and made inquiries re obtaining services of nearest salvage tug to assist. At 7.15 p.m. the North Sydney station advised tug *Foundation Franklin* proceeding full speed to assistance. The ss. *Simonburn* and *Brandon* reported also proceeding to assist. The crew of the *Fernmoor* were taken off by the *Foundation Franklin*, vessel abandoned, total loss.

#### *Yarmouth, N.S., Direction Finding*

Schooner *Ellen T. Marschal*.—At 06.20 G.M.T. on December 16, 1933, the Yarmouth Station received a message from the ss. *Lars Kruse* advising fishing schooner *Ellen T. Marschal* caught fire at 23.00 G.M.T. on 15th, entire crew of 26 men left ship in 8 dories, at 06.00 G.M.T. picked up 4 men from one boat but unable sight any others, *Lars Kruse* standing by position at 06.00 G.M.T. 43.11 N 65.49 W. At 06.24 G.M.T. the Yarmouth station broadcast this information to all ships. At 06.51 G.M.T. *Lars Kruse* advised picked up 4 men from another dory. It was later ascertained that 23 of crew were saved, three drowned, vessel total loss.

#### *Fame Point, P.Q.*

SS. *Susaa*.—At 7.57 a.m. E.S.T. on November 12, 1933, the Fame Point Station was advised by the Ellis Bay, Anticosti Island station, that a vessel was ashore at Heath point in a dangerous position. It was not until 8.30 a.m. that full details of casualty were obtained from Ellis Bay when same were broadcast by Fame Point with the request that vessels in vicinity of Heath point report positions. At 8.49 a.m. the ss. *Manchester Brigade* reported position 70 miles from Heath point. At 9.2 a.m. Ellis Bay advised *Susaa* had sunk, crew coming ashore in boats and at 1.35 p.m. all crew saved.

#### *Montreal, P.Q.*

SS. *Nidarholm*.—At 9.06 p.m. E.S.T. on August 31, 1933, the ss. *Nidarholm* requested the Montreal Station to dispatch a fire or pumping boat immediately to her at Sorel to quell fire in engine room. The Montreal and Quebec Signal Service agents were advised immediately and a tug was dispatched from Sorel to assist. At 9.25 p.m. the *Nidarholm* reported fire put out no assistance required.

The East Coast stations were also of assistance to the ss. *Canby*, *Pennyworth*, *Fowberry Tower*, *Patrick J. O'Hara*, and schooner *Max C*.

## EAST COAST VISUAL SIGNAL SERVICE

Visual signal stations on the East coast are under the administration of the Radio Branch and under the direct jurisdiction of the Division Superintendent of Radio at Halifax. All radio stations report ships communicated with and this is supplemented by reports of ships sighted by the visual signal stations, which are organized to tie in with the East Coast Radio Service.

*Magdalen Islands.*—Including Grindstone, Amherst Island, Pleasant Bay, Grosse Isle and Etang du Nord. Wireless to Sydney.

*Aspy Bay.*—Signal agent part time. Landline to Sydney.

*Scatari Island.*—Signal agent part time. Landline and telephone to Sydney.

*Point Tupper.*—Signal agent part time. Landline to Sydney; ice reports to Canso. Vessels reported during the year, 247.

*Sydney, C.B.*—The duties of signal agent are undertaken by the Superintendent of Pilots, who, upon receipt of reports, analyses same and forwards to central offices at Halifax and Quebec as requisite.

*Halifax, N.S.*—This station is located at the Citadel and maintains a continuous watch day and night and is in direct communication with Chebucto Head radio and signal station by a private telephone. This station is also equipped with a radiotelephone set for the purpose of communicating with the Halifax pilot boats *Hebridean* and *Nauphila* which are similarly equipped. A total of 1,408 ships were reported by the Citadel Station during the year. Shipping companies, immigration officials and the public are kept well informed on all shipping matters. Shipping and weather reports, also ice reports in season, are furnished twice daily to the Board of Trade and the press. Constant communication is also maintained with the pilot boats by radiotelephone.

*Chebucto Head.*—This station is situated at the entrance to Halifax Harbour and reports the passing of all vessels to the signal station at the Citadel. Three full time signal agents are maintained for visual signalling. The Coast Direction Finding Station situated at the same point reports all vessels communicated with by wireless, giving position and probable time of arrival. The station is organized for lamp signalling at night to vessels not fitted with wireless. The total of in-bound vessels reported by this station during the year was 1,391.

*Sambro Light Vessel.*—This lightship keeps a lookout and reports all passing vessels not fitted with wireless to Chebucto Head.

*Saint John, N.B.*—The signal station at Saint John is situated in the Customs building, and is connected by telephone to the Red Head Coast Direction Finding Station. One full time signal clerk is employed. Vessels reported during the year, 368.

*Lurcher Lightship.*—Reports all ships spoken or sighted, by wireless, to Red Head, Saint John.

*Partridge Island.*—Signal agent part time. Telephone to Saint John, N.B. Inward bound vessels reported during the year, 368.

*Point Lepreau.*—Signal agent part time. Landline to Saint John, N.B. Eighty vessels were reported during the year.

## PUBLIC HARBOURS AND HARBOUR COMMISSIONS

REPORT OF THE SUPERVISOR, A. R. TIBBITS

The work of this branch is divided into two sections:—

First—handling of the departmental work in connection with the administration of Part XII of the Canada Shipping Act relating to public harbours and harbour masters;

Second—the work in connection with the supervision of departmental relations with the Harbour Commissions which are created in virtue of individual Acts of Parliament for each harbour to administer the affairs of the major public harbours; including the construction of the necessary terminal facilities after the plans, etc., covering same have been approved by the Governor in Council; the financing of these improvements with loans provided by the Government under special legislation; the operation of the harbour facilities and the control of navigation within the harbour limits and the general administration of harbour affairs pursuant to the powers conferred on each Commission in its incorporating legislation.

## PUBLIC HARBOURS AND HARBOUR MASTERS

The law, providing for the proclamation of any water area as a public harbour and for the appointment of a harbour master to administer, under the Minister of Marine, the harbour regulations, will be found in Part XII of the Canada Shipping Act, chapter 186 R.S.C. 1927. The regulations governing navigation and other operations in the harbour are provided under the authority of the Governor in Council and it is the duty of the harbour master to enforce same and to report any violations to the department. He is also required to discharge such other duties in the harbour as the minister may direct.

Each harbour master is required to make an annual report, based on the calendar year, of the vessels entering the harbour under his charge, giving the name of the vessel and her master, with her net registered tonnage and any harbour dues collected on the vessel's entry under the provisions of the Act, which provides for a payment of harbour dues twice a year according to the vessel's net registered tonnage at the first and second public harbours which the vessel may enter in any one year,—excepting such harbours as are under the commission form of administration, where the vessel must pay in accordance with special regulations enacted by the Harbour Commissioners of such harbour, providing for the payment of the dues and harbour charges to be imposed there.

The returns of the various harbour masters for the year under review show increased activity at a number of the ports, particularly ports in the Maritimes and on the Pacific coast, where a revival in the lumber business has resulted in an increased amount of shipping visiting the ports in the lumber-producing sections.

The harbour masters are paid entirely from a portion of fees collected by them which they are allowed to retain, and it depends entirely on the number of vessels entering a port in any one year that have not paid dues twice previously at some port as to what the harbour master's remuneration is to be.

A tabulation of the amounts collected by the harbour masters for harbour dues during the year, with the remuneration retained by the harbour masters, and the net amount remitted for deposit to the credit of the Consolidated fund, is given, also by Provinces, next hereunder:

## HARBOUR DUES—SUMMARY FOR CALENDAR YEAR 1933

Province	Amount collected		Remuneration		Amount remitted	
	\$	cts.	\$	cts.	\$	cts.
Ontario.....	2,235	50	1,674	50	561	00 less \$7.00 refunded.
Quebec.....	1,722	50	1,210	50	512	00
Nova Scotia.....	2,461	50	2,461	50	Nil	
New Brunswick.....	515	00	510	00	5	00
Prince Edward Island.....	268	50	268	50		
British Columbia.....	4,868	50	3,767	00	1,101	50
Grand total.....	12,071	50	9,892	00	2,172	50

Operations have gone on smoothly in the public harbours during the year and no reports of any serious infringement of the regulations have been received from the different harbour masters.

## HARBOUR COMMISSIONS

The annual reports, as required by the terms of their creating legislation, have been received from all the different Harbour Commissions. These reports are issued in printed form, containing much interesting and valuable information respecting the operations of the ports for the calendar year 1933, including the volume of shipping using the ports; the tonnage and nature of the commodities imported and exported through the ports for the year and other details of operations by the Harbour Commissions at the following ports:—Halifax in Nova Scotia, Saint John in New Brunswick, Quebec and Montreal in Quebec, and Vancouver and New Westminster in British Columbia. Copies of these reports are available for distribution on application to the Secretaries of the Commissions at the different ports.

Manuscript reports have been made to the Department by the following Harbour Commissions:—Three Rivers and Chicoutimi in Quebec, Hamilton in Ontario, and North Fraser in British Columbia.

The reports of the different harbours under the commission form of administration show varying financial results in the ports' operations during the year. The reports of the Montreal, Three Rivers, Chicoutimi and Vancouver Harbour Commissions show a decrease in receipts over expenditures during the year 1933; while those of the Quebec, Halifax, Saint John, New Westminster and Hamilton Commissions show similarly a substantial proportionate increase. The proportion of expenditures of revenue to receipts has resulted in an operation deficit at the ports of Montreal, Chicoutimi, Saint John, Vancouver and New Westminster (the deficit in the latter being caused through a loss of the rental from their grain elevator during a portion of the year). The ports of Quebec, Three Rivers, Halifax and Hamilton show, conversely, an operating surplus. The definite results in this respect are shown in the tables following:—

COMPARATIVE REVENUE AND EXPENDITURE STATEMENT OF THE VARIOUS HARBOUR COMMISSIONS

	Montreal	Quebec	Three Rivers	Chicoutimi	Halifax	St. John	Vancouver	New Westminster	Hamilton, Ont.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Revenue—									
1932.....	4,407,530 96	630,809 87	65,535 29	16,315 12	333,815 04	222,096 73	1,696,729 47	21,293 66	60,170 50
1933.....	3,874,449 49	687,816 22	64,096 76	15,696 61	342,280 52	238,688 13	1,519,811 71	33,641 74	67,152 58
	Dec. 533,081 47	Inc. 57,006 35	Dec. 1,438 53	Dec. 618 51	Inc. 8,465 48	Inc. 16,591 40	Dec. 176,917 76	Inc. 12,438 08	Inc. 6,982 08
Expenditure—									
1932.....	5,456,622 58	647,864 82	73,373 22	13,640 87	334,481 83	216,866 57	1,733,019 86	20,561 17	55,015 10
1933.....	5,282,365 70	670,767 12	58,637 53	17,815 31	334,597 77	256,261 30	1,762,477 96	25,303 61	58,763 89
	Dec. 174,256 88	Inc. 22,902 30	Dec. 14,735 69	Inc. 4,174 44	Inc. 115 94	Inc. 39,394 73	Inc. 29,458 10	Inc. 4,742 44	Inc. 3,748 79
1933:—									
Surplus.....		17,049 10	5,459 23		7,682 75			8,338 13	8,388 69
or									
Deficit.....	1,407,916 21			2,118 70		17,573 17	242,666 25	Deduct: Loss on elev. oper..... 21,387 14	
								Deficit.....	\$13,049 01

The shipments of grain handled at the elevators in the different ports under Commission administration, as may be expected in view of the grain situation that existed during the year, show large decreases over the preceding year at the ports of Montreal and Vancouver—the largest grain shipping ports; while at Quebec there was a very considerable increase, with a moderate increase at Saint John, and a proportionately large increase at Halifax, where grain shipments have not been very heavy in any year. The shipments at the various ports, in bushels, are shown in the table following:—

COMPARATIVE STATEMENT OF GRAIN SHIPMENTS

—	Montreal	Quebec	Vancouver	Saint John	Halifax
	bush.	bush.	bush.	bush.	bush.
1933.....	65,435,618	16,716,535	67,842,855	6,660,798	2,741,798
1932.....	112,883,703	5,023,635	104,665,416	6,310,861	1,695,420
	Decr. 47,448,095	Incr. 11,693,900	Decr. 36,822,561	Incr. 349,937	Incr. 1,046,378

The capital expenditures at the different ports under the administration of Harbour Commissions have been reduced to an amount that would accomplish only the most urgent and necessary requirements in the way of provision of port facilities. The destruction by fire of the upper portion of the sheds on pier No. 2, in Halifax, during the winter just past, caused an unusual expenditure of approximately \$565,000 by the commissioners there. However, as this pier affords one of the most important and useful shipping terminals in the port, it was essential that the facility should be restored with the least possible delay.

Work on the new facilities at West Saint John was completed during the year and the new pier and the Navy Island quay wall with complete facilities of trackage, grain elevator conveyors connecting all berths with the commissioners' and Canadian Pacific Railway elevators and most adequate modern fire-proof transit sheds, were opened to shipping in December last, and Saint John now stands as one of the best equipped ports on the Atlantic seaboard.

A new method of financing the Harbour Commissions' work of construction for the provision of required facilities, which temporarily relieved the Government of the burden of providing the necessary funds on loan to the commissioners during this period of difficult financing, was adopted during the year. This was the authorizing of the Commissioners to make contracts for works for which payment was to be made to the contractor by three year bonds of the commission, payable at the completion of all the work and bearing interest from that date at 3 per cent per annum. Work was contracted for by the Harbour Commissioners of Saint John, Halifax, Chicoutimi and Three Rivers, to be carried out with payments to be made in this manner.

Before the final months of the period reviewed in the commissioners' reports had elapsed there were definite indications of a revival of business, which leads to a very strong hope that the reports of the different Harbour Commissions for the succeeding year will show a great increase in shipping and harbour operations with a consequent increase in revenue, and that these reports for the year 1934 will show a great improvement in the results of harbour operations.

The omission of any reference to the financial operations of the Toronto Harbour Commission in the above tables is explained by the fact that, although the Toronto Harbour Commission is created under the same authority as the other Harbour Commissions, and comes under the jurisdiction of the Minister of Marine, a large portion of the harbour property belonged to the City of

Toronto at the time the Harbour Commission was reorganized in 1911, and in the new Act (chapter 26 of the statutes of 1911) which amended and consolidated all Acts relating to the harbour of Toronto and created the present Toronto Harbour Commission, the property of the city was made over to the Harbour Commission thereby created, and the personnel of the Harbour Commission was made to consist of five persons—three to be appointed by the Municipal Council of the City of Toronto; one by the Governor in Council; and one by the Governor in Council on the recommendation of the Board of Trade of Toronto—and any surplus revenue arising from the operations of the commissioners, after the payment of the cost of management of the harbour and harbour facilities and all other liabilities of the corporation, became the property of the city of Toronto to be paid over by the commissioners to the city treasury; and the audit department of the city of Toronto was given authority to make an inspection of all the commissioners' accounts, the commissioners being required to report annually with respect to its finances to the council of the city.

## BOARD OF STEAMSHIP INSPECTION

REPORT OF CHAIRMAN, FRANK McDONNELL, M.E.I.C.

### LEGISLATION

A considerable amount of work has been done during the past fiscal year in connection with the revision of the Canada Shipping Act. Drafts have also been prepared of regulations for the Protection of Persons Employed in Loading or Unloading Ships, and for Safety of Life at Sea as provided for in the International Convention of May, 1929.

### ENGINEER EXAMINATIONS

During the fiscal year 209 candidates for certificates of competency were granted certificates as marine engineers. In addition, 62 temporary engineer certificates were issued, also 33 certificates to motor engineers.

### STEAMSHIP INSPECTION OFFICES

Steamship Inspection offices are maintained at the following ports: Halifax, N.S., Saint John, N.B., Quebec, P.Q., Sorel, P.Q., Montreal, P.Q., Kingston, Ont., Toronto, Ont., Midland, Ont., Collingwood, Ont., Port Arthur, Ont., Vancouver, B.C., and Victoria, B.C.

Appended will be found a table showing the number of inspections made, fees collected, etc.

TABLE showing the Number of Inspections made, Fees collected, etc., during the Year ending March 31, 1934

Division	Number of inspections made, with gross tonnage of vessels inspected				Number of vessels not inspected, with gross tonnage	Total number of vessels subject to inspection when in commission, with gross tonnage	Number of vessels added to the Dominion, with gross tonnage		Number of vessels lost, broken up or destroyed, with gross tonnage			
	Vessels registered or owned in the Dominion		Vessels registered or owned elsewhere				No.	Gross tonnage	No.	Gross tonnage	No.	Gross tonnage
	No.	Gross tonnage	No.	Gross tonnage								
Halifax.....	98	121,053	19	80,169	17	4,799	134	206,021			3	276
Saint John.....	42	50,745	2	11,228	54	33,940	98	95,913			1	254
Quebec.....	61	41,325			19	6,206	80	47,531	1	676		
Sorel.....	62	37,292			55	28,062	117	65,354			4	578
Montreal.....	125	83,735	2	7,278	74	11,131	201	102,144	1	(Not reg'd)	2	279
Kingston.....	77	86,775	3	351	22	32,354	102	119,480				
Toronto.....	200	326,731	32	42,788	25	32,066	257	401,585	2	3,866		
Midland.....	59	71,542	1	39	38	21,468	98	93,049	2	58	3	521
Collingwood.....	76	22,593			32	3,031	108	25,624	4	74	3	305
Port Arthur.....	63	64,622	1	2,944	87	20,693	151	88,259	3	48	1	28
Vancouver.....	201	97,777	12	78,261	96	42,329	309	218,367			6	2,135
Victoria.....	61	56,858	10	67,486	26	24,006	97	148,350	2	1,271	1	89
Totals.....	1,125	1,061,048	82	290,544	545	260,085	1,752	1,611,677	15	5,993	24	4,466

According to Departmental records the following fees have been collected on account of Steamboat Inspection:—

Annual.....	\$ 92,175 39
Incidental.....	8,359 95
For approval of plans.....	972 50
For examination of engineers.....	1,171 00
<b>Total.....</b>	<b>\$ 102,678 84</b>

## CORRESPONDENCE

The number of letters received during the fiscal year 1933-34 was 182,289.  
The number of letters sent out during the fiscal year 1933-34 was 134,768.

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