REPORT OF COMMISSION

OF INQUIRY INTO

THE CASUALTY TO THE BRITISH STEAMSHIP "EMPRESS OF IRELAND,"

WHICH SANK AFTER COLLISION WITH THE NORWEGIAN STEAMER "STORSTAD," IN THE RIVER ST. LAWRENCE, ON 29TH MAY, 1914.

Presented to both Houses of Parliament by Command of His Majesty.

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Chateau Frontenac, Quebec,
11th July, 1914.

To the Honourable J. D. HAZEN,
Minister of Marine and Fisheries.

"EMPRESS OF IRELAND."

SIR,

I HAVE the honour to transmit to you the Report of the Commissioners appointed by you to inquire into the foundering of the above-named vessel.

Believe me,
Most respectfully yours,
(Signed) MERSEY.

WARRANT OF APPOINTMENT OF COMMISSION.

CANADA.

To the Right Honourable JOHN CHARLES, BARON MERSEY, the Honourable EZEKIEL McLEOD, Chief Justice of New Brunswick, and Local Judge in Admiralty of the Exchequer Court of Canada, for the New Brunswick Admiralty District, and the Honourable Sir ADOLPHE BASILE ROUTHIER, Local Judge in Admiralty of the Exchequer Court of Canada for the Quebec Admiralty District.

GREETING:

KNOW YOU that under and by virtue of the provisions of Part X. of the Canada Shipping Act as amended, and in virtue of all other powers in that behalf in me vested, I, the Honourable John Douglas Hazen, The Minister of Marine and Fisheries of Canada, do hereby nominate, constitute and appoint you, the said John Charles, Baron Mersey, Ezekiel McLeod and Sir Adolphe Basile Routhier to be Commissioners to hold a formal investigation under and subject to the requirements of the said Part X. of the Canada Shipping Act as amended, into and concerning a shipping casualty which I, the said Minister, consider to be of extreme gravity and special importance, and with respect to which I have ordered a formal investigation under the authority of the said statute, whereby the British steamship "Empress of Ireland," of about 8,028 tons, registered tonnage, official number 123972, of which the Canadian Pacific Railway Company was the registered owner and H. G. Kendall was the Master, was sunk in collision with the Norwegian steamship "Storstad," in the River St. Lawrence on the morning of Friday, the twenty-ninth day of May, 1914, and many lives of the passengers and crew of the said steamship "Empress of Ireland" were lost.

TO HAVE and to hold, exercise and enjoy all the office of Commissioners as aforesaid unto you the said John Charles, Baron Mersey, Ezekiel McLeod and Adolphe Basile Routhier, together with all and every the powers, rights, authority and privileges, and subject to the obligations and requirements, under and by virtue of the said Part X. of the Canada Shipping Act to or in respect of the said office of right or by law appertaining or enacted.

And I do moreover designate you, the said John Charles, Baron Mersey, to be the President of the said Commission or Court hereby constituted.

Given under my hand at Ottawa this 13th day of June in the year of Our Lord one thousand nine hundred and fourteen.

(Signed) J. D. HAZEN,
Minister of Marine and Fisheries of Canada.

INTRODUCTION.

The terms of our warrant of appointment require us to inquire into the casualty whereby the S.S. "Empress of Ireland" was sunk in collision with the Norwegian steamer "Storstad." We have interpreted this reference as requiring us to investigate not merely the question of responsibility for the collision; but also the questions why the ship sank so quickly afterward, whether adequate measures were taken to save the lives of those on board, and whether any steps can be taken in the future to prevent or mitigate the terrible consequences of similar disasters.

It will accordingly be convenient to divide our report into sections dealing with the following matters:

1. Description of the two ships;
2. Summary of the stories of the two parties;
3. Consideration of who was to blame for the collision;
4. Reasons for the rapid sinking of the ship;
5. The life-saving appliances on board the "Empress of Ireland," and the measures taken to save life by both vessels;
6. Answers to questions propounded by the Canadian Government;
7. Suggestions.

The Commission met on June 16th and sat for the purpose of hearing evidence and the addresses of Counsel until Saturday, June 27th, 1914. We heard 59 witnesses.

We were assisted by the advice of the following Assessors:—

Commander Caborne, C.B., R.N.R.,
Captain L. A. Demers, F.R.A.S.,
Commander Howe, R.N.,
Professor J. J. Welch, M.Sc., M.Inst.C.E.

The parties were represented by Counsel as follows:—

For the Crown:
Mr. E. L. Newcombe, K.C., Deputy Minister of Justice,
Mr. Eusebe Belleau, K.C.

For the Canadian Pacific Railway Company:
Mr. Butler Aspinall, K.C.,
Mr. E. W. Beatty,
Mr. F. E. Meredith, K.C.,
Mr. A. R. Holden, K.C.

For the Master, Engineers and Officers of the S.S. "Empress of Ireland":
Mr. Aimé Geoffrion, K.C.,
Mr. Cecil Thompson.

For the owners of the S.S. "Storstad":
Mr. C. A. Duclos, K.C.,
Mr. C. S. Haight,
Mr. J. W. Griffin,
Mr. N. B. Beecher.

For the Dominion Coal Co., Charterers of the S.S. "Storstad":
Mr. H. MacInnes, K.C.

For the National Sailors' and Firemen's Union of Great Britain and Ireland:
Mr. G. F. Gibsone, K.C.

(2062—14.) Wt. 15553—G 254. 3000. 9/14. D & S G.4.

REPORT

PART I.

DESCRIPTION OF THE TWO VESSELS.

(*a*) S.S. "Empress of Ireland."

This ship was designed hy the late Dr. Francis Elgar and was constructed by the Fairfield Shiphuilding and Engineering Co., at Govan, in 1906, under Board of Trade and Lloyd's Survey, to class star 100 A1 at Lloyds.

She was of shelter-deck type, having a straight stem and elliptical stern. Her length between perpendiculars was 550 feet, hreadth moulded 65½ feet. and depth moulded to upper deck amidships, 40 feet.

Her official number was 123972, gross tonnage 14191 and net tonnage 8028.

Decks.

Four complete steel decks, viz., shelter deck, upper deck, main deck and lower deck, ran from stem to stern, the minimum heights of the first three ahove the designed load line (27½ feet from underside of keel) heing 21, 13 and 5 feet respectively, whilst the lower deck amidships was 3 feet helow that line. A steel orlop deck was fitted before and abaft the machinery spaces, 8 feet below the lower deck, whilst 8½ feet above the shelter deck a lower promenade deck extended for a length of about 390 feet, practically from the stern, and a forecastle of the same height extended over a length of 84 feet. Ahove the lower promenade deck an upper promenade deck and a hoat deck were fitted for nearly one-half the length of the vessel amidships; the upper promenade deck was 8 feet ahove the lower promenade deck, and the boat deck was 45½ feet ahove the designed water line.

Watertight Bulkheads.

The transverse watertight bulkheads were ten in number, and terminated in each case at the upper deck. They were numhered 1 to 10 from the bow, the collision bulkhead being the first named. No. 1 bulkhead, 34½ feet from the bow, was stepped forward at the lower deck for a length of 9 feet, and a continuation of the forward part of this hulkhead downwards, formed the forward hulkhead of chain locker. No. 2 bulkhead was situated 40½ feet ahaft No. 1; No. 3 was 49½ feet abaft No. 2; No. 4 was 51¾ feet abaft No. 3, and formed the forward limit of the machinery spaces, being on the forward side of the cross coal hunker at the fore end of the forward boiler room.

No. 5 hulkhead was situated at the after end of the forward boiler room, 87¾ feet ahaft No. 4. It had cross coal bunkers on hoth its forward and after sides. It was stepped forward at the main deck for a distance of ahout 25 feet, forming a watertight flat at the main deck, and was then carried up to the upper deck. A watertight passage was constructed amidships on the after side of this hulkhead at the boiler room floor level, and a watertight door was fitted at its after end for access between the forward and after boiler rooms. This passage extended dust-tight through the cross coal bunkers on the forward side of this hulkhead. A partly watertight and partly dust-tight steam-pipe passage was also fitted amidships in the hunkers above the communication passage just named. No. 6 hulkhead was situated 87¾ feet ahaft No. 5, and formed the after end of the after hoiler room separating this space from the engine room; it had a cross coal hunker on its fore side. A watertight recess 11 feet wide extended forward under the lower deck for a distance of 4 feet 6 inches, and this recess contained the watertight door providing access from the engine room to the after boiler room, dust-tight passage heing fitted on the fore side of this door through the cross coal bunker. It also had a watertight pocket or recess on the starhoard side above the main deck, extending hack to the engineer's gangway at ship's side and fitted with a watertight door at its after end. No. 7 hulkhead was fitted at the after end of the engine room 69¾ feet ahaft No. 6, and was stepped forward horizontally at the orlop deck for a distance of 18 feet, heing then carried vertically to the upper deck.

No. 8 bulkbead was situated 22½ feet abaft No. 7. It was recessed aft one frame space in tbe centre portion of tbe sbip below the orlop deck, the remaining portion of tbe bulkhead extending vertically from keel to upper deck. No. 9 bulkbead was 40½ feet abaft No. 8, and formed tbe after limit of tbe cellular double bottom.

No. 10 bulkbead was 33¾ feet aft of No. 9, and 31¾ feet forward of stern. It was stepped aft for a distance of 20 feet at tbe lower deck, and tben extended vertically to tbe upper deck.

Tbe watertigbt bulkbeads were constructed in accordance witb tbe recommendations of tbe Board of Trade Bulkbead Committee of 1891, tbe specification to wbicb the vessel was built being based on tbese requirements as regards watertigbt subdivision, and tbe vessel was so built.

The bulkbeads were so placed tbat any two adjacent compartments migbt be flooded wben floating at a mean draft of 27½ feet, witbout sinking tbe sbip below tbe margin-of-safety line drawn below tbe upper deck, in accordance witb tbe recommendations of the above-mentioned Committee.

Watertight Doors.

A number of watertigbt doors—24 in all—were fitted in tbese bulkbeads as detailed below, tbose on tbe lower and main decks being of the borizontal-sliding type worked by rack and pinion; two in tbe bolds were of the vertical sliding, and the others were of tbe borizontal-sliding type.

Position and Description of Watertight Doors.

—	In Hold.	Orlop Deck.	Lower Deck.	Main Deck
No. 1 blkd.... ...	Nil	Nil	Nil	Nil.
No. 2 „	Nil	Nil	Nil	Nil.
No. 3 „	Nil	Nil	Nil	2 (H.S.) st. and port 6′ 6″ by 3′ in passages.
No. 4 „	Nil	Nil	1 (H.S.) 6′ by 3′	2 (H.S.) 6′ 6″ by 3′ st. and port in passages.
No. 5 „	1 (V.S.) 5′ 6″ by 2′ pass. between boiler room on centre line.	Nil	2 (H.S.) 6′ by 3′ st. and port in coal bunkers.	2 (H.S.) 6′ 6″ by 3′ st. and port side of uptake casing in passages.
No. 6 „	1 (V.S.) 5′ 6″ by 2′ aft end of passage to engine room on centre line.	Nil	2 (H.S.) 6′ by 3′ st. and port in coal bunkers.	1 (H.S) 6′ 6″ by 3′ st. blkd. pocketed aft to gangway port above coal bunker.
No. 7 „	Nil	1 (H.S.) 5′ by 2′ 1″.	Nil	2 (H.S.) 6′ 6″ by 3′ st. and port in passageways, inside cabins.
No. 8 „	2 (H.S.) 5′ by 2′ 1″ leading to shaft tunnels.	Nil	Nil	2 (H.S.) 6′ 6″ by 3′ st. and port in passageways.
No. 9 „	Nil	Nil	Nil	2 (H.S.) 6′ 6″ by 3′ st. and port in passageways, between cargo hold trunk and cabins.
No. 10 „	Nil	1 (H.S.) 4′ by 2′ fore end steering compartment.	Nil	Nil.

All tbe gearing for working these doors was carried to the upper deck level, and eacb door was worked by band power, a bandle or key being provided adjacent to tbe working position. All tbe doors were fitted witb sill plates.

Cellular Double Bottom.

A cellular double bottom was worked between bulkheads 1 and 9, 4 feet 6 inches in deptb and 47 feet in breadth at its widest part; its total capacity was 1,522 tons of water.

Appropriation of Spaces.

The appropriation of spaces below the upper deck was as follows :—

Spaces.	*Appropriation.*
Forward of No. 1 or collision bulkhead.	*Trimming Tank* to orlop deck, *Chain Locker* to lower deck and *Store Rooms* elsewhere.
Between bulkheads Nos. 1 and 2.	*Cargo* to lower deck. Space above up to upper deck available for either *Steerage Passengers or Cargo.*
Between bulkheads Nos. 2 and 3.	*Cargo* to lower deck; *Steerage Passengers* to main deck; *Third-class Passengers* above main deck.
Between bulkheads Nos. 3 and 4.	*Deep Tanks* for stowage of cargo or for water ballast up to lower deck; and *Third-class Accommodation* above that deck.
Between bulkheads Nos 4 and 5.	*Forward Boiler Room* (to main deck) containing 3 double-ended boilers forward, and one single-ended boiler aft; a coal cross-block was worked at each end, with side bunkers. The bunker bulkheads throughout were not watertight. These bunkers are subdivided by a non-watertight flat at the height of the lower deck, so that the upper or reserve bunkers may be utilised when required for the carriage of cargo. The forward cross block below lower deck level is subdivided at the middle line of ship by a longitudinal bulkhead pierced by two manholes, each 3 feet deep and 1½ feet wide, whilst the after block was subdivided at its lower portion by the practically watertight sides of a middle line passage-way communicating with the after boiler room. Above this passage-way, and immediately below the lower deck, a similar passage for steam pipes was fitted. the two passages being connected by a middle line partition containing manholes. The total depth of the passage-ways was about fifteen feet. Above the main deck there was accommodation for *Third Class Passengers.*
Between bulkheads Nos. 5 and 6.	*After Boiler Room* (to main deck), containing three double-ended boilers aft and two single-ended boilers forward, with uptakes leading to after funnel, and having a cross block at each end, with side bunkers. As in the forward boiler room, a non-watertight flat was worked at the height of the lower deck, and for the same purpose. The forward cross-block was subdivided amidships by passages and partitions in a similar manner to that described for the after block of the forward boiler room, except that the lower passage way was absolutely watertight from bulkhead No. 5 to the watertight door at the after end of passage way. The after cross-block also had a communication passage through it to the engine room at the stokehold level, a partition lightened by manholes joining this passage-way to lower deck, and above this deck was worked a steam-pipe passage similar to those already described. Above the main deck the *Third-class Dining Saloon* was situated at the fore end, and *Store Rooms* were located abaft this.
Between bulkheads Nos. 6 and 7.	*Engine Room* up to main deck, containing two sets of twin-screw quadruple-expansion engines, with a reserve bunker or cargo space on each side between lower and main deck; from thence to upper deck the *Second class Bath Rooms*, &c., were arranged abreast engine-room casings.

Spaces.	*Appropriation.*
Between bulkheads Nos. 7 and 8.	*Cold Storage Chambers and Fresh Water Tanks* up to main deck; *Second-class Cabins* above main deck.
Between bulkheads Nos. 8 and 9.	*Cargo* up to main deck; *Second-class Cabins* above this deck.
Between bulkheads Nos. 9 and 10.	*Cargo* up to main deck; *Second-class Cabins above* this deck.
Abaft No. 10 to stern.	*Steering Compartment* up to lower deck; *Store Rooms* above this deck.

Between the upper and shelter decks the *Third-class Passengers* were accommodated at the forward end. Abaft this, on the starboard side, a range of *First class Passengers' Cabins* (inner and outer) extended to the engine-room casing, with the *Second-class Accommodation* further aft; on the port side the *Stewards, Engineers, and Cooks* were accommodated, with *Stores*, &c. Right aft, on both sides of the ship, the *Firemen* were berthed, whilst *Baggage, Mail*, and other rooms were arranged fore and aft at the middle line. The *Seamen's* quarters were under the forecastle deck.

The houses above the shelter deck contained accommodation for *First-class Passengers*, whilst the *Marconi House* was on the boat deck.

Access to Decks.

Provision was made for the necessary means of access to the upper, promenade and boat decks from the various compartments utilised for the classes of accommodation carried.

Sidelights.

The lowest (and partial) range of sidelights was forward in the 3rd class and steerage quarters on the lower deck. These lights were extra strong ordinary brass sidelights, 10 inches diameter clear glass, fitted with plugs and hinged cast-iron covers. A number of these were of the automatic ventilating type. Between the main and upper decks there was a complete range of sidelights of the size and types just mentioned (except that those in the 3rd class dining saloon were 12 inches diameter), whilst those in the forecastle were also 10 inches diameter clear glass. Between the upper and shelter decks the sidelights were 12 inches diameter clear glass, and between the shelter and the lower promenade decks 16 inches and 14 inches diameter. In the deck houses above the lower promenade deck there were rectangular sliding or hinged windows about 20 inches by 14 inches in the clear.

The minimum heights above the designed water line of the lower edges of the ranges of circular ports were:—

Ports between	lower and main decks	5 feet
,, ,,	main and upper decks	11 ,,
,, ,,	upper and shelter decks	19 ,,
,, ,,	shelter and lower promenade decks ...	27 ,,

The height first given above was that of the furthest aft of the partial range of ports; the others are the heights of the ports amidships, so that forward and aft the ports were higher than indicated above on account of the sheer of the decks.

The vessel was provided with a single-plate rudder of partially balanced type, actuated by Brown's steam-steering gear, with telemotor; the gear was placed right aft, on the orlop deck, below water. The rudder was increased in size in 1908, and when so augmented its area was 227 square feet or 1·53 per cent. of the immersed middle line area. The steering engine was controlled by telemotor from the wheelhouse and also from the promenade deck aft, an indicator being fitted in wheel house. There were sufficient boats for all on board, and wireless telegraphy and submarine signalling apparatus were installed.

The main propelling machinery of the vessel was of the twin-screw quadruple expansion type, each engine having four cranks, with working parts balanced on the Yarrow-Schlick-Tweedy system. The four cylinders were, respectively, 36 inches, 52 inches, 75 inches, and 108 inches in diameter, with a stroke of 5 feet 9 inches.

Steam was supplied from six double-ended and three single-ended boilers, fitted in two boiler rooms, as previous described.

The maximum sea-going speed of the vessel was about 18 knots, and the machinery could develop about 18,000 I.H.P.

(*b*) S.S. "STORSTAD."

This vessel was constructed by Messrs. Armstrong Whitworth and Company, Limited, of Newcastle-on-Tyne, in 1910.

She is 440 feet long between perpendiculars, 58·1 feet beam, and has a moulded depth of 28 feet 8 inches and a mean draft when loaded of 25½ feet.

The vessel was constructed on the Isherwood longitudinal system. She is divided into eight watertight compartments by seven transverse bulkheads, No. 1, or the collision bulkhead, being about 24 feet abaft the stem.

A cellular double bottom extends the whole length of the vessel, arranged for water ballast, and trimming tanks are also fitted in the two compartments at the ends of the vessel.

The stem of the vessel consists of a forging made in two parts, scarphed, and rivetted. The longitudinal frames on each side are about 18 inches apart at the stem, and corresponding frames on the two sides are secured together by triangular bracket plates.

The vessel was fitted with two stockless anchors in cast-iron bawse pipes, the flukes projecting 18 inches from the ship's side.

She is capable of carrying about 10,800 tons of coal or cargo at the above mean draught, and her main propelling machinery consists of a 3-cylinder triple-expansion engine, of about 4,000 I.H.P., steam being supplied by three single-ended cylindrical marine type boilers, capable of giving the vessel an average speed of about 10 knots when loaded.

She is fitted with a rudder of the ordinary type supported by pintles, which is capable of being worked both by hand and steam gear.

PART II.

THE TWO STORIES.

(1) THE STORY OF THE S.S. "EMPRESS OF IRELAND."

Navigation of the Vessel up to the point of sighting the "Storstad."

The "Empress of Ireland" left Quebec, at about 4.20 p.m. (Montreal time), on the 28th May, in charge of a Quebec pilot, Adelard Bernier by name, with a crew of 420 hands, and 1,057 passengers, and some general cargo, bound for Liverpool.

The master of the vessel was Captain H. G. Kendall, who has held an Extra Master's Certificate for 12 years, and has been in the service of the Canadian Pacific Railway Company for 11½ years, during the last 6½ of which he had been in command of ships of that Company. He first took command of the "Empress of Ireland" on May 1st, 1914, at Halifax, Novia Scotia. In addition to the Captain there were six certificated officers, of whom four held Master's Certificates, and two Mate's Certificates. The engineers were 12 in number, of whom we were informed that 11 held first-class certificates, though only four were credited with such certificates in the Articles. The crew was constituted as follows: deck department, 59, including officers; engine-room department, 130, and victualling department, 222. In addition to these there were four supernumerary engineers, and five musicians.

From 12 to 4 a.m. on the morning of the 29th May, it was the first officer's watch, the third officer being associated with him to form a double watch. The Captain himself, however, remained on the bridge and had charge of the navigation of the vessel. In addition there was a quartermaster at the wheel, and another quartermaster (Murphy), and a deck boy standing by. Of these six persons, only the Master, first officer and Murphy survive.

It was a beautiful and clear night with a young moon and stars shining; but before reaching Father Point, a slight fog had been met on two occasions (1) between Red Island and Bic, and (2) between Bic and Father Point, on both of which occasions speed was reduced to half speed and slow, and the whistle was used.

The pilot was dropped about a mile north of Father Point Gas Buoy, at about 1.20 a.m., the weather being then fine and clear. A course of N. 47° E. magnetic was then set in order to obtain an offing from the shore, and the vessel proceeded to sea at full speed, which the Master states was between 17 and 18 knots an hour.

After the vessel had been running on this course for a little time, the Cock Point Gas Buoy was sighted by the look-out in the crow's nest and reported, and shortly

afterwards, just before getting Cock Point on the beam, the masthead lights of a steamer, which subsequently proved to be the "Storstad," were sighted between three and four points on the starboard bow, approximately six miles away, the weather at that time being fine and clear.

Navigation from Moment of Sighting the "Storstad" until the Fog Intervened.

After running on the course N. 47° E. magnetic, for about 18 minutes, to a point at which Cock Point Buoy was about 2½ miles away on the starboard beam, and about 4½ miles from Father Point, Captain Kendall, considering that he had made the necessary offing from the shore, altered his course to N. 76° E. by compass, or N. 73° E. magnetic, with the object of proceeding down the river. When this change had been carried out, the masthead lights of the "Storstad" were still visible, about a point or a point and a half on the starboard bow, about four miles away, and it was intended to pass the vessel starboard to starboard.

At this moment Captain Kendall, going to the higher bridge, verified the heading of the ship by the standard compass and took the bearing of the lights. He stated that he found that the "Storstad" lights were bearing N. 87° E. by compass, 11 degrees on his starboard bow, and that her course would therefore take her easily to starboard of his ship.

A little later, Captain Kendall, returning to the navigation bridge, sighted the green light of the "Storstad" off his starboard bow, and about the same time a fog bank was seen coming off the land, and dimming the lights of the "Storstad."

Navigation in Fog.

As soon as the fog began to affect the "Storstad's" lights the engines of the "Empress of Ireland" were stopped, and put full speed astern, and her whistle was blown three short blasts, signifying that this had been done.

About a minute later the fog shut out the lights of the "Storstad," which were then seen bearing about one point on the starboard bow. A prolonged blast of the "Storstad's" whistle was heard about two points off the starboard bow of the "Empress of Ireland," signifying that the "Storstad" had way upon her, and the sound appeared to come from about a mile or a mile and a half away. The "Empress of Ireland" then blew a series of three short blasts. A prolonged blast from the "Storstad" was again heard about four points off the starboard bow of the "Empress of Ireland."

At about this time the "Empress of Ireland" being at a standstill in the water and heading about N. 76° E. by compass or N. 73° E. magnetic, her engines were stopped and two long blasts sounded on the whistle, signifying that she was stopped and had no way upon her. Another prolonged blast was heard from the "Storstad" still on the starboard bow, apparently about six points, and about a mile away. The whistle of the "Empress of Ireland" thereupon again sounded two long blasts. As the position of the sounds heard from the "Storstad" was broadening first from two points to four and then from four to six, Captain Kendall supposed the relative positions of the two ships to be perfectly safe.

The Collision.

Very soon after the "Empress of Ireland" had blown the second set of two long blasts, the mast head lights and the two side lights of the "Storstad" were seen by Captain Kendall about 100 feet away, almost at right angles to the "Empress of Ireland," and approaching at a fast speed.

Captain Kendall by megaphone hailed the "Storstad" to go full speed astern, and at about the same time the "Storstad" was heard to begin sounding three short blasts, the third of which sounded as the "Storstad" struck the "Empress of Ireland," as mentioned in the next paragraph.

In the hope of possibly avoiding or minimizing the effect of a collision the engines of the "Empress of Ireland" were ordered full speed ahead, and her helm was ordered hard aport; but the "Storstad" continuing to come on at a fast speed of about 10 knots struck the "Empress of Ireland" amidships and penetrated through her steel decks to the extent of 15 to 20 feet. The angle of the two ships at the moment of collision was about 7 points.

The engines of the "Empress of Ireland" were immediately stopped, and the "Storstad" was requested, by megaphone, to go full speed ahead. The ships, however, after a few seconds, separated, and orders were given to put the engines of the "Empress of Ireland" full speed ahead, with a view to beaching the vessel, which at that moment was listing heavily to starboard. Steam, however, failed, the engines stopped, and the lights went out. The vessel continued to list and about 15 minutes after the collision foundered. She was then heading S.E. by compass, *i.e.*, substantially to starboard of her course. The locality was about $6\frac{1}{2}$ to $6\frac{3}{4}$ miles East of Father Point, and the time of the collision was about 1.55 a.m. (Montreal time).

(2) The Story of the "Storstad."

Navigation up to the Point of Sighting the "Empress of Ireland."

The s.s. "Storstad" was running on time charter for the Dominion Coal Company, and at 12.30 (Montreal time) of the morning of the collision was abreast of Metis Point, on a voyage from Sydney, Nova Scotia, to Montreal, with a cargo of between 10,000 and 11,000 tons of coal. The watch was being kept by the Chief and 3rd Officers, there was a quartermaster at the wheel, a lookout man forward, and another A.B. standing by on deck. The Chief Officer, Mr. Toftenes, who has held a Norwegian Master's Certificate for about seven years, had served as an officer on the vessel for $3\frac{1}{2}$ years, and had been chief officer about 5 or 6 weeks before the casualty occurred. The 3rd Officer, Mr. Saxe, has held a Mate's certificate for two years, and had served as Mate for 14 months, of which 13 had been spent on the "Storstad." The vessel was under the command of Captain Thomas Andersen, who had given standing orders to the Chief Officer that he was to be called in case of fog, and that in any case he was to be called six miles before the ship reached Father Point to take on the pilot.

Abreast of Metis Point, the estimated distance of the "Storstad" from the shore was about four miles, a course was laid W. $\frac{1}{4}$ S. Magnetic, and the ship ran, by the patent log six knots through the water, this distance being, however, subject to a slight allowance in respect of the tide. The course was then changed to W. $\frac{1}{2}$ S Magnetic, and the ship ran by the patent log, five knots. Shortly afterwards, about 1.30 a.m., the course was changed to W. by S. Just before the change was made, or just after, the masthead lights of the "Empress of Ireland" were seen approximately two points on the port bow of the "Storstad," about 6 or 7 knots away. They were at that time open to starboard.

Navigation from moment of Sighting "Empress of Ireland" till Fog Intervened.

Six or seven minutes after sighting the masthead lights, the green side light of the "Empress of Ireland" was seen about a point and a half on the "Storstad's" port bow, apparently from 3 to 5 miles away. The "Empress of Ireland" was showing her green light for an interval, and was then seen to make a change in her course. Her masthead lights came into a line, and she showed both the green and red sidelights. The "Empress of Ireland" then continued to swing to starboard, shutting out the green and showing only the red light about a point or a point and a half on the "Storstad's" port bow. This light was shown for from 2 to 4 or 5 minutes, and was only shut out from the observation of the "Storstad" by the fog. When the fog intervened, the "Empress of Ireland" was still one and a half to two points on the port bow, and was about two miles away. The chief officer of the "Storstad" assumed that it was her intention to pass him port to port, and if the relative positions of the vessels at this moment had been maintained they would have passed red to red with ample room.

Navigation in Fog

When the "Empress of Ireland" was enveloped in the fog, she was heard to blow a signal of one prolonged blast on her whistle. The "Storstad" answered the signal with one prolonged blast. One or two minutes later the "Storstad" was enveloped in the fog, and the Chief Officer ordered his engines to 'slow,' and after one or two minutes to 'stop.' According to the Third Mate, there was a second exchange then of prolonged single blasts between the two steamers, but the Chief Officer himself is not sure whether a second prolonged blast was ever heard from the "Empress of Ireland." It is agreed, however, that a little later a signal of three short blasts was heard from the "Empress of Ireland," and answered by one

long whistle, signifying that the "Storstad" had way upon her. Saxe, the Third Mate, admits further that there was a second series of three short blasts from the "Empress of Ireland," and states that it was answered by one prolonged blast from the "Storstad."

A little later the Chief Officer of the "Storstad," in order to counteract the influence of a current upon the heading of his vessel, ordered the wheel to be ported. This was done; but the vessel did not answer, and the Third Officer then put the wheel hard over to port himself to make sure that it should go all the way. Still the "Storstad" did not swing, and then, finding that his vessel had lost steerage way, the Chief Officer ordered a signal to he blown of two long blasts, to show that his vessel was not under steerage way. About the same time in order that his vessel might not become entirely unmanageable, he gave a signal on the telegraph "slow ahead." It was not till this order had been given that the Chief Officer called the Captain and told him it was getting foggy. The Captain asked if Father Point could be seen, and the Chief Officer replied that it had just been shut out hy the fog. No mention was made of any vessel in the vicinity.

Captain Andersen went on the bridge and found hy the compass that his course was W. by S. $\frac{1}{2}$ S. (W. by S. Magnetic) and an instant later saw a masthead light about 3 points or perhaps a little more on his port bow, moving at a fast pace across the "Storstad's" course from port to starboard. He immediately ordered the engines full speed astern.

The Collision.

Captain Andersen estimates the distance of the "Empress of Ireland" when first sighted to have been from 600 to 800 feet. Immediately after the masthead light he saw the green light, and a few moments (Captain Andersen says half a minute) after the "Empress of Ireland" was first seen, the vessels came together. The angle made hy the starhoard side of the two vessels was approximately three points.

Captain Andersen heard a hail through a megaphone from the "Empress of Ireland" telling him to go ahead full speed, and he shouted hack "I am going ahead full speed." He instantly ordered his engines full speed ahead at the moment of contact; hut he states that, owing to the pace at which the "Empress of Ireland" was moving it was quite impossible for him to keep his stem in the wound, and that his bow was swung to starboard until the two vessels were almost parallel. So much was he swung round that he was afraid the "Empress of Ireland" would hit his port how, and in order to bring his heading back towards the land he put his helm hard aport, ordered his engines ahead and made a complete circle. The "Empress of Ireland" had meantime disappeared in the fog, and he blew a number of whistle signals to ascertain her whereahouts; but got no answer.

It was ahout 8 or 10 minutes after the collision hefore he got his first idea of her whereabouts through hearing a chorus of cries from people in the water. He thereupon manœuvred his vessel as close to the "Empress of Ireland" as he dared, and at the earliest possihle moment his four boats were lowered.

The collision took place at about 2.06 a.m., and his heading at the moment of contact was W. by S. Magnetic.

PART III

Which Ship was to Blame.

The question as to who, if anyone, is to blame for the collision in this case depends largely on whicb of the two stories put forward hy the respective owners of the vessels is to be accepted. The main difference between the two stories is to he found in the description of the way in which the two vessels were approaching each other at the time the "Empress of Ireland" changed her course, after having obtained an offing from Father Point.

Father Point is the place at which the "Empress of Ireland," the outward bound ship, had dropped her pilot. It is also the place at which the "Storstad," the inward bound ship, was to pick up her pilot It is situated on the south side of the river.

The witnesses from the "Storstad" say they were approaching so as to pass red to red; while those from the "Empress of Ireland" say they were approaching so as to pass green to green. The stories are irreconcilahle, and we have to determine which is the more probahle. Times, distances and bearings vary so much even

in the evidence from witnesses from the same ship, that it is impossible to rely or to base conclusions upon them. We have, therefore, thought it advisable to found our conclusions almost entirely upon other events spoken to by the witnesses and upon their probable sequence in order to arrive at a solution of the difficulty.

While the Inquiry was proceeding, and before the position of the wreck had been ascertained, the Court asked Captain Kendall and Mr. Toftenes, the Chief Officer of the " Storstad," to mark on a chart the place at which they thought the collision had taken place, and they did it. They were in reasonable agreement; but they were both wrong, possibly to some extent because the chart used was a small scale chart, and it was difficult for the witnesses to be precise. But the position of the wreck has now been definitely ascertained. It is Lat. N. 48° 37′ 30″, Long. W. 68° 22′ 0″, to the south of both the points marked, and in our opinion that position fixes with sufficient accuracy the spot where the collision took place.

Upon the " Empress of Ireland " leaving Father Point, her course was N. 47° E. Magnetic. This is a usual course. Her engines had been put at full speed; but we think that she probably never reached that speed at any time before the collision. Her maximum speed was probably at no time more than 14 or 15 knots. Later on, her course was altered under a port held to N. 73° E. Magnetic. The exact point at which this change was made is uncertain; but it was a customary change for outward bound vessels. It was shortly before this change that the two vessels first sighted each other, and they were then at a distance of six to eight miles apart. This was about 1.30 a.m. (Montreal time), and at about this time the " Storstad " set a course of W. by S. from which the witnesses from that vessel say she was never subsequently changed. The bearings of the two vessels, one to the other, are matters of uncertainty; but both agree that neither at this time nor at any time before the lights were shut out by the fog which subsequently surrounded them, did their relative positions involve risk of collision. The " Empress of Ireland," according to her own account, had been a crossing ship; but at such a distance as to involve no risk of collision, and before the fog shut out the " Storstad's " lights, she had, according to Captain Kendall, ceased to be a crossing ship, and was safely green to green. According to Mr. Toftenes, the " Empress of Ireland " was a crossing ship until she altered her course (to N. 73° E. Magnetic), when he claims that she ceased to be a crossing ship, and made a course towards the " Storstad " which brought the two ships red to red. This manœuvre is said by Mr. Toftenes to have taken place when the two ships were about 1½ to 2 miles apart, and is described by him in these words : " As far as I could see she was then just keeping on my port side—going clear on my port side," intending to pass port to port, and leaving ample room if both ships kept their courses.

After carefully weighing the evidence we have come to the conclusion that Mr. Toftenes was mistaken if he supposed that there was any intention on the part of the " Empress of Ireland " to pass port to port, or that she, in fact, by her lights manifested the intention of doing so; but it appears to us to be a mistake which would have been of no consequence, if both ships had subsequently kept their courses.

Shortly after the ships came into the position of green to green—as claimed by Captain Kendall—or red to red—as claimed by Mr. Toftenes—the fog shut them out from each other, and it is while they were both enveloped in this fog that the course of one or the other was changed, and the collision brought about. From the evidence adduced on behalf of both vessels, it is plain that before the fog, and when they last saw each other, there was no risk of collision if each kept her course. Therefore, the question as to who is to blame, resolves itself into a simple issue, namely, which of the two ships changed her course during the fog.

With reference to this issue, it will be convenient to deal with the evidence connected with the " Empress of Ireland " first.

No witness speaks of having seen her make any change of course during the fog, and those who were on board, engaged in her navigation, distinctly deny that any change whatever was made. The question which naturally arises, is, why should she change her course? She had been set on the proper course for her voyage, and she was in a thick fog, and it was her duty to keep her course. What object could be served by changing her course? Mr. Haight, the counsel for the " Storstad," felt this difficulty, and he set up more than one theory to explain the suggested change. He was at first of opinion that some one on board had starboarded the wheel. He said, " It is my idea that one man, perhaps the Second Mate, ordered his wheel ported, and that another man ordered the wheel starboarded," and when asked why? he says, "It is exceedingly difficult to say why, unless the position was supposed

to be safe, and the fog shut us out, and the course was going to take them a little out of their ordinary way, and the big steamship said we have speed enough and room enough, and we can cross bis bow." Later on in the case the Captain of the "Storstad," when under examination, was asked by the Court whether he could suggest a reason for the alleged change of course of the "Empress of Ireland," and his answer was: "I cannot say; but I might think when the fog set in the ship was trying to get further out in clear weather."

There is, in our opinion, no ground for saying that the course of the "Empress of Ireland" was ever changed in the sense that the wheel was wilfully moved; but as the hearing proceeded another explanation was propounded, namely, that the vessel changed her course, not by reason of any wilful alteration of ber wheel, but in consequence of some uncontrollable movement, which was accounted for at one time on the hypothesis that the telemotor steering gear was out of order, and at another by the theory that having regard to the fulness of the stern of the "Empress of Ireland" the area of the rudder was insufficient. Evidence was called in support of this explanation. It is not necessary to examine this evidence in detail. The principal witness on the point as to the steering gear was a man named Galway, one of the quartermasters on the "Empress of Ireland." He had made two voyages on this ship. He stated that on one occasion going up the river, and while he was at the wheel in a narrow passage below Quebec, called the Traverse, the vessel behaved in an extraordinary manner, sheering to port against a port wheel, and only missing by 40 feet a schooner which was approaching. He further stated that between 8 and 12 o'clock on the evening of the 28th of May, when the "Empress of Ireland" was going down the St. Lawrence, an incident of a different kind occurred, viz., that when he put the wheel over to port "the gear jammed for the matter of a few minutes," and he had to pull it in order to make it work again. Another similar incident, he said, occurred in his previous voyage when the vessel was in the Mersey. He said that he reported the jamming incident to Williams, the second officer on the bridge (who was drowned) and to the pilot Bernier. He said that he also mentioned the matter to Quartermaster Murphy, who relieved him at midnight. Pilot Bernier and Murphy were called, and denied that Galway had made any complaint whatever to them about the steering gear. It further appeared that he had given a statement to some newspaper reporter about the collision, and that he had given a very full account of it to the solicitor for the owners of the "Empress of Ireland"; but that he had not mentioned the steering gear to either of them. Galway gave his evidence badly, and made so unsatisfactory a witness that we cannot rely on his testimony. Some evidence was called, however, to confirm Galway. This was the evidence of three men and the pilot from another Norwegian collier, called the "Alden," a boat under time charter to tbe Dominion Coal Company, who were the charterers of the "Storstad." These witnesses spoke to having passed the "Empress of Ireland" on her way down the river, about 9.20 (Montreal time) on the evening of the 28th May, and they said she was swinging and steering badly, changing from red to green several times. The witnesses do not speak of any behaviour of the vessel which would suggest "jamming," and it is to be observed that the allegation that the vessel sheered from side to side on this occasion, is entirely different from the allegation of Galway that the wheel jammed, an event which so far from making the vessel swing from side to side, would keep her head swinging one way.

On the other hand we have the evidence from the officers on board the "Empress of Ireland," and of her pilot, all of whom affirmed that the steering-gear was in perfect order, and worked well.

A further point that was made by Counsel for the "Storstad" was an admission by Murphy, the quartermaster of the "Empress of Ireland." He said with reference to the wheel that "It might be that it does not catch, and what you have to do is to put your wheel back amidships and give it the helm, and it will catch on right away." He stated, however, that this had only occurred once during the four years and five months for which he had been quartermaster of the "Empress of Ireland." We do not attach any importance to the incident.

On the whole question of the telemotor steering-gear, we are of opinion that the allegations as to its condition are not well-founded. We have consulted our advisers, and they concur in this opinion.

Then a suggestion was made that the area of the "Empress of Ireland's" rudder, having regard to the fulness of her stern, was not large enough to enable

the ship to steer well. We mention this to show that we have not overlooked it; but we dismiss it from further consideration, inasmuch as we are satisfied that here too no real complaint can be made against the steering of the ship.

This disposes of the evidence put forward in support of the suggestion that the "Empress of Ireland" changed her course by reason of circumstances which were beyond the master's control.

It is necessary, however, to refer to a manœuvre of the "Empress of Ireland," commenced when the lights of the "Storstad" first began to grow dim in the fog, and continued for some uncertain time after. This manœuvre consisted of reversing her engines full speed astern. That this manœuvre was, in fact, executed we have no doubt. It was evidenced by appropriate whistle signals from the "Empress of Ireland," which were heard by the "Storstad." When Captain Kendall was asked to give his reason for his order to put his engines full-speed astern, he explained to us that knowing the "Storstad" was in the vicinity he wished to take the way off his ship and bring her to a stationary condition. He thought this a prudent course. It was said on behalf of the "Storstad" that the order was probably given because the "Empress of Ireland" had become unmanageable by reason of her defective steering-gear. We cannot accept this suggestion, but we do think the stopping evidences uneasiness on the part of Captain Kendall, and a consciousness that his ship was possibly in too close proximity to the "Storstad." We think that he would have been better advised if he had given the "Storstad" a wider berth, and had navigated his ship so as to pass the "Storstad" at a greater distance on his beam than he originally intended. We do not think, however, that his stopping, which was really done for greater caution, can be said to have been an unseamanlike act, nor do we consider his failure to give the wider berth as a contributory cause of the disaster.

It is now necessary to consider the position and conduct of the "Storstad," with the view of ascertaining whether it was she who changed her course.

It is admitted that those on board the "Storstad" did that which in ordinary circumstances would change her course, and that they did it in the fog shortly before the accident. They ported, and they hard-a-ported, the "Storstad's" helm. Assuming that she answered to this hard-a-port helm, the effect would be to bring her head round to starboard in the direction of the "Empress of Ireland," and if she continued under this helm the effect would be to bring her into collision with the "Empress of Ireland." It was said, however, that the porting of the helm, although done while the ship was in the fog, was an act of prudent navigation, because it was done to counteract the effect of a current which exists in the locality; and it was further said that by reason of this current, and by reason of the fact that the "Storstad" had little or no way on her, the porting had no effect on her course, which remained W. by S., as it had been for half an hour or more before. We are unable to accept this view. Mr. Haight, in his statement made to us before any evidence was called, informed us that Mr. Toftenes, who was in charge of the "Storstad," had explained to him that the object of porting the helm was to "make sure of ample room," and this is, no doubt, true. No current was then mentioned. Then the character of the damage done to the "Storstad's" bow (which we have seen) satisfies us that considerable way must have been on her at the time she dealt the blow on the "Empress of Ireland's" starboard side. Captain Kendall said that at the time of the collision his ship was lying in the water, stopped dead, and that, therefore, no movement of his ship contributed to the force of the impact. This is, perhaps, doubtful. We think that, although his engines had been reversed for some minutes, Captain Kendall may be mistaken in supposing that way had been entirely taken off his ship, and it is possible, therefore, that to some extent her movement may have contributed to the force of the blow. But the fact remains that the "Storstad" ported her helm and changed her course, and so brought about the collision.

It may be asked what induced the men in charge of the "Storstad"—Mr. Toftenes and Mr. Saxe—to port and to hard-a-port the helm? The explanation is fairly plain. They believed (wrongly as it turned out) that the "Empress of Ireland" was passing their ship red to red. They wanted, as Mr. Toftenes said to Mr. Haight when he gave his first version of the story, "to make sure of ample room," and they ported in order to secure it. Unfortunately, the "Empress of Ireland" was passing green to green, and so far from the porting securing more ample room, it brought the vessels into closer proximity, and then into collision.

We are further of opinion that Mr. Toftenes, the officer in charge of the "Storstad," was negligent in omitting to call the captain when the fog was coming

on At this time the captain was asleep in his room; but he had left orders that in the event of fog coming on he should be called to the deck, and there was a standing order on his ship to this effect. It is of the last importance that when a ship encounters a fog her navigation should be in the control of a man of experience and of judgment. In this case no step was taken to bring the captain to the deck until too late. The captain is the man who ought to have been there. Mr. Toftenes says that he thought there was no danger, and therefore that it did not matter. He was wrong; there was danger and, anyway, it was his duty to obey the order which he had received to call the captain when the fog came on.

We regret to have to impute blame to anyone in connection with this lamentable disaster, and we should not do so if we felt that any reasonable alternative was left to us. We can, however, come to no other conclusion than that Mr. Toftenes was wrong and negligent in altering his course in the fog, as he undoubtedly did, and that he was wrong and negligent in keeping the navigation of the vessel in his own hands, and in failing to call the captain when he saw the fog coming on.

It is not to be supposed that this disaster was in any way attributable to any special characteristics of the St. Lawrence waterway. It was a disaster which might have occurred in the Thames, in the Clyde, in the Mersey, or elsewhere in similar circumstances.

Such is the conclusion at which we have arrived on the question as to who was to blame for the disaster. But a question of much greater public interest and importance remains to be considered, viz., why the ship sank so quickly, and what steps, if any, can be taken to prevent the terrible consequences which so often follow from such disasters.

PART IV.

CAUSE OF RAPID SINKING OF THE SHIP.

Were the Watertight Doors and Ports in the "Empress of Ireland" open or shut at the time of the collision?

Watertight Doors.

Definite evidence was given to show that the vertical sliding watertight door providing communication between engine room and after boiler room at the stokehold level was effectively closed after the collision took place; but no information was available as to whether the reserve bunker doors higher up on the same bulkhead, or that on the forward bulkhead of the fore boiler room, between the lower and main decks, connecting the reserve bunker with the steerage passenger or cargo space, were open or shut, although it is presumed they were shut. An unsuccessful attempt was made to close the vertical sliding door between the two boiler rooms at the stokehold level, but no evidence was available with reference to the two doors on the same bulkhead between the lower and main decks.

Immediately above the main deck, as set out in the detailed statement of the vessel's construction, at least one horizontal sliding watertight door was fitted in each of the bulkheads number 3 to 9, and no evidence was forthcoming to show that any of these doors were closed at the moment of the collision. It was stated that some of the doors on the port side were closed after the collision, as the gear for actuating these were adjacent to the stewards' quarters and readily accessible; but attempts made to close the starboard door of the 3rd class dining saloon, and the door on the same side of the ship at the fore end of the 2nd class accommodation, were ineffectual.

The door last named was vitally important, since it was in a bulkhead which completed, above the main deck, the watertight bulkhead at the after end of the boiler compartments. It may be mentioned that the operation of closing the doors on the port side would be facilitated by any list to starboard, the arrangement being such that the weight of the door under the circumstances mentioned tended to close it; but the contrary was true of those on the starboard side. One witness mentioned that he either heard or saw some gear for closing watertight doors working, and from his position at the time, it is possible that the door at the after end of the 2nd class lavatory accommodation on the starboard side was closed.

Practically all the doors between main and upper decks must necessarily have been open under ordinary circumstances for convenience of communication between

cabins and dining saloons, &c., and, therefore, in view of the fact that the only two known attempts to close doors on the starboard side were unsuccessful, it seems practically certain that other attempts on that side, if made, had a similar result, and that nearly all the watertight doors on the starboard side between main and upper decks remained open after the collision.

Port Holes or Sidelights.

It was stated in evidence that all the lower ports would be closed at the time of the collision, whilst others higher up would be open. Other evidence showed that some ports in cabins between the main and upper decks were closed some hours before the collision, and that others in the alleyways between the same decks were open at that time. It is certain that some ports at this level were open after the collision, for one passenger, in the 3rd class accommodation forward, deposed to being awakened by water falling on his bed from the open portbole, and others testified to seeing water pour through port holes in alleyways and elsewhere near the after end of the ship.

Evidence was also forthcoming to show that water entered through open ports in side between the upper and shelter decks.

Nature and extent of the damage resulting from the collision, and position at which "Empress of Ireland" was struck.

So far as the "Empress of Ireland" is concerned, no direct evidence as to the extent of the damage was available since no survivor from the "Empress of Ireland" nor anyone from the "Storstad" has testified to having seen the torn side of this vessel. Divers report that the sunken liner is lying on her starboard side at a considerable inclination from the horizontal, and with her starboard bilge buried in mud. No examination of the damage has been possible up to the present time, and the engineer in charge of the diving operations considers such examination a very hazardous and perhaps impossible undertaking. Information on this point can therefore only be gathered from an examination of the damaged bow of the "Storstad." This vessel was more extensively damaged on the starboard than on the port bow, as first contact with the "Empress of Ireland" was made on that how; hut on the port side also the injuries were severe.

The shelter deck of the "Storstad" apparently entered just below the shelter deck of the "Empress of Ireland," the stem head of the former above the shelter deck being broken off. The vertical depth of the hole made in the side of the "Empress of Ireland" must have been approximately 46 feet, about 25 feet of this being below water at the time of the collision. It is not possible to determine the lateral dimensions of the aperture, as there may have been some longitudinal ripping action, which would produce a wider hole than one caused by the simple direct blow. But, excluding such action and estimating the size of the hole from the position of the limiting marks of injury on "Storstad," the conclusion has been reached that the area below water of the hole made in the side of the "Empress of Ireland" was, immediately after the collision, no less than 350 square feet.

The position at which the "Storstad" came into contact with the "Empress of Ireland" can be determined with some precision. In the first place a cabin number plate (No. 328) from the last-named vessel was found after the collision on the shelter deck of the "Storstad," near the stem. The cabin bearing this number was an outer one situated between the upper and shelter decks of the "Empress of Ireland" slightly abaft amidships, the door being 7 feet in from the side. Further, the engineer on watch in the forward boiler room stated that 20 seconds after the collision "water rushed through the starboard No. 2 bunker," entering the stokehold through the full area of the bunker doorway; whilst the engineer on duty in the after boiler room noticed water pouring in in large volume out of the forward bunker door on the starboard side, almost immediately after the shock of the impact was felt.

From these facts it is clear that the "Empress of Ireland" was damaged in the immediate vicinity of the watertight bulkhead fitted between the two boiler rooms, whilst the stem of the "Storstad" must have penetrated into the side of the "Empress of Ireland" sufficiently far to reach the door of the cabin before mentioned. This door was 16 feet abaft the bulkhead, the watertightness of which was destroyed.

Effect of the collision on the stability of the "Empress of Ireland."

Just before the collision the mean draft of the vessel was 27 feet; she was carrying 1,160 tons of cargo, 2,300 tons of coal, and all the double-bottom tanks were filled with either fresh or salt water. Her metacentric height under these circumstances was just over 40 inches, and with all port holes closed her stability at large angles of heel was ample.

The immediate effect of the damage referred to above was to destroy the watertightness of the bulkhead dividing the two boiler rooms, and to place these compartments (with a combined length of 175 feet) in communication with the sea. From an examination of the damage done to the bow of the "Storstad" it has been estimated that the area of the hole made in the side of the "Empress of Ireland" was sufficient to allow an initial inflow of water into the vessel of 265 tons per second, supposing such inflow unobstructed. Coal and other obstructions would lessen this rate, but it is certain that in a very short time both boiler rooms would be entirely flooded up to the water level outside, as from the evidence is known to have been the case. Flooding these compartments involved a mean sinkage of practically 9 feet, and assuming, in the first place, that the water as it rose in these compartments was symmetrically distributed with reference to the middle line of the ship, this sinkage would take the main deck 4 feet below the water at amidships, and this deck would be below water throughout its length except for a comparatively short portion forward. Under these conditions of damage the ship would still have had a metacentric height of just over two feet, and would have continued to float upright had the watertight doors in bulkheads above the main deck bounding the damaged length been closed. Under the actual conditions prevailing at the time of the collision, however, with the side of the vessel, where struck, open to the sea above the main deck, and with bulkhead doors on the starboard side of that deck open, water could find its way freely over that deck, thus wholly destroying the vessel's stability and causing her to capsize and founder.

For convenience of description it has been assumed in the foregoing that the entering water was distributed symmetrically with reference to the middle line of the ship, but initially this was certainly not the case. The "Storstad" penetrated the starboard side of the "Empress of Ireland" at the cross coal bunker fitted between the two boiler rooms, this cross bunker being subdivided athwartships by the watertight bulkhead separating the boiler rooms. This bunker was also divided at the middle line of ship, below the lower deck level, by longitudinal watertight or dust-tight communication and steam-pipe passages, connected by a non-watertight partition. The part of this cross block which was in the forward boiler room was connected on the starboard side to a longitudinal bunker running to a cross-block at the forward end of that room, this latter being divided below the lower deck and at the middle line of ship, by a non-watertight longitudinal partition. Very similar arrangements existed abreast the after boiler room, details of these being given in the portion of this report which deals with the construction of the ship. The bunker bulkheads of this vessel, in accordance with usual practice, were not watertight. It may be added that the arrangement of coal was practically symmetrical with reference to the middle line of ship.

There is no evidence that the "Storstad" destroyed any portion of the bunker bulkheads, so that very shortly after the impact a large quantity of water must have entered the bunkers on the starboard side for the whole length of the boiler rooms, which water was able to escape only through bunker doors into the boiler rooms and relatively slowly also across the middle line partitions in coal bunkers to the port side of the vessel. Under these circumstances the ship would at once commence to list to starboard, the precise angle of inclination at any time being dependent upon the actual rate of inflow of water and the rate of its distribution across the ship. In the absence of this information a close estimate of the list is not possible; but making reasonable approximations an inclination of some 15 to 20 degrees appears probable under these circumstances. From such a list the vessel might have recovered as the water got to the port side if all port holes, and all watertight doors in bulkheads bounding the boiler compartments up to upper deck, had been closed; but with doors and sidelights open to the extent known to have obtained after the collision, water was free to enter other compartments, and the final capsizing and foundering became inevitable.

Thus, summarising the foregoing, it will be seen that whilst the entry of water on the starboard side naturally induced a tendency to heel to that side, the heeling

effect was increased by the fact that the bunker bulkheads retarded the free flow of water across the ship. Very shortly after the collision the vessel must, for this reason, have listed to a considerable angle, and this, combined with the bodily sinkage of the vessel, would speedily immerse the side ports known to be open between main and upper decks. As the sinkage, due to the entry of water through the injured side and through the port holes continued, water would, under the actual circumstances existing at the time of the collision, obtain free access to the main deck, with the results already indicated.

PART V.

LIFE-SAVING APPLIANCES.

Measures taken to Save Life.

According to the Board of Trade Surveyor's Certificate, the "Empress of Ireland" was provided with the following boats:—

Number and Description.	Materials.	Contents in Cubic Feet.	Number of persons to accommodate.
16 lifeboats	Steel	7,640	764
20 Englehardt boats	Wood and canvas	9,200	920
4 Berthon boats	Do.	1 747	176
Total		18,587	1,860

It was stated in evidence that there were also two other Berthon boats on board, having a combined carrying capacity of 105 persons.

All the lifeboats, eight on each side of the ship, were under davits, fourteen of them being on the boat deck and two on the lower promenade deck at the after end of the vessel. They were distinguished by odd numbers on the starboard side and even numbers on the port side.

Under each steel lifeboat there was placed an Englehardt boat, and four other Englehardt boats were stowed on the after lower promenade deck.

The Berthon boats were on the boat deck, two on each side of the ship abreast of the Marconi wireless house, and one on each side of the engine-room skylight.

All the above-mentioned boats appear to have been in good order, and were provided and fitted with their necessary gear and equipment; but none of them were furnished with patent lowering or detaching gear.

For other life-saving appliances, she was supplied with 24 lifebuoys, which were disposed about the bridge and rails, floating lights being attached to half that number, and 2,212 lifebelts, of which 150 were for children. The lifebuoys and lifebelts were in good order.

In each passenger cabin throughout the ship, there were sufficient lifebelts for the number of persons accommodated therein, and the lifebelts for the members of the crew were available in their respective quarters.

On the 15th May, 1914, the vessel, when about to take her departure for Quebec, was cleared at Liverpool by Mr. Thomas E. Thompson, Emigration Officer, and in a report made by him to the Board of Trade, dated the 4th of June, 1914, he states that on examining the crew, who were mustered on the saloon deck, he found that each man had a badge pinned to his coat showing the number of the boat to which he belonged, and that the sailors were so divided as to provide at least two for each boat under davits.

As soon as the muster was over, the bugle was sounded, and all hands repaired to the boat deck, and the order "Out all boats" was given. The whole of the boats under davits, sixteen in number, were at once swung out. Two sailors were in each, and they shipped the thole pins, passed the ends of the painters out, and shipped the rudders, the rest of the boat's crew setting up the guys and clearing away the falls. About four minutes elapsed between the time when the order was given and the time when the boats were ready for lowering.

Two of the Englehardt collapsible boats were also opened up, the canvas sides rigged, and all gear shipped

The equipment of all the boats was found to be in order and to comply with the regulations.

The fire-extinguishing appliances were examined in various parts of the ship, attention was paid to ladderways, exits, &c., which were found in order, and it was ascertained that emergency-direction oil lamps were placed where necessary.

After swinging in the boats, the crew were summoned to fire stations by bell and bugle, hoses were stretched along and the water turned on, and a number of stewards were also told off to control the passengers in case of need. Two fire annihilators picked out at random from the steerages, were turned on and found in order.

The Emigration Officer also saw the watertight doors in the steerages, in the first and second class passenger accommodation, and in the engine and boiler rooms closed, and they worked to his satisfaction.

With regard to the boat and fire drills, each member of the crew appeared to know his duties, and both drills were carried out quickly and without confusion.

On the 23rd of May, 1914, the day after the "Empress of Ireland" arrived at Quebec, she was inspected by Captain Hugh G. Staunton, Superintendent of Life-Saving Appliances and Marine Superintendent to the Canadian Pacific Railway Company, who found the life-saving appliances in good condition.

Upon that occasion, the crew were exercised at boat drill, and three boats were put into the water (a larger number was not lowered on account of the coal lighters alongside the ship) and two of the collapsible boats were opened out and rigged.

In addition to the ordinary life-saving appliances enumerated above, the vessel had a standard one-and-a-half kilowatt installation of Marconi wireless telegraphic apparatus, as also an emergency set of the same, the instrument room and the operators' sleeping accommodation being situated on the boat deck, just forward of the engine-room skylight.

There were two Marconi operators employed, namely, Mr. Ronald Ferguson, the senior operator, and Mr. Edward Bamford, his assistant, one of whom was constantly on duty in the instrument room when the ship was under weigh.

Life-saving by "Empress of Ireland's" Boats.

When Captain Kendall saw that the collision was inevitable he ordered the First Officer (Mr. Edward Jones), who was with him on the bridge, to call all hands and to get the boats ready. The siren was also sounded as a signal to the crew to close watertight doors and to prepare to abandon the ship. The collision having occurred, the order was then given to get all the boats out as soon as possible.

The crew appear to have responded readily to the call made upon them, and to have worked well, but soon, owing to the rapid and great influx of water, the ship listed so rapidly to starboard that it was absolutely impossible to put out the port boats.

In the meantime, the stewards, certain of whom were on watch during the night, aroused the passengers, lighted the emergency lamps provided for the purpose, and assisted individuals to put on their lifebelts.

Although, very naturally, there was some confusion, there does not appear to have been any lack of discipline, and one of the passengers saved (Mr. Smart) testified to the kindliness and consideration shown for one another by those so suddenly confronted with the gravest peril.

Nos. 1, 3, 5, 9, 13 and 15 starboard lifeboats were got into the water, No. 1 swinging heavily out, and throwing several persons overboard, and No. 15 capsizing. While endeavouring to lower No. 7, the ship fell over on her starboard beam ends and foundered. At the time she fell over the port boats and other movables crashed down on to the starboard side of the ship.

Unfortunately all the officers, with the exception of the Master and First Officer, were drowned, and so it is not altogether easy to follow the movements of the different boats.

At the moment when the "Empress of Ireland" fell over, her funnels striking the water, Captain Kendall was on the flying bridge, and thence fell overboard. He was rescued by lifeboat No. 3, took charge of her, and commenced to pick up people who were hanging on to the wreckage. When the boat contained as many persons as it would hold—which was about 55 or 60—others were distributed around the outside of the boat, hanging on to the life lines, and by this means many lives were saved. This boat proceeded to the "Storstad," put those in or clinging to her on board, and then, still in charge of Captain Kendall and manned by the members of

the " Empress of Ireland's " crew, returned to the wreckage in order to search for other survivors, hut only succeeded in finding dead hodies. Noticing another of the " Empress of Ireland's " hoats ahout two miles off, Captain Kendall pulled towards her, and found that she was smashed, half full of water, and unoccupied. No. 3 then went hack to the " Storstad."

The First Officer (Mr. Jones) having seen Nos. 1, 3, and 5 lifehoats put out, went to No. 7, hut hefore it could he launched, the vessel capsized, and he was thrown into the water. However, he was picked up hy No. 9, which, when it had heen filled with other survivors, went to the " Storstad," discharged them, and then returned to search for more. Upon this latter occasion she saved eight ladies and three or four men, who were put on hoard the Canadian Government steamer " Eureka," of which more hereafter. Another trip was made, but only corpses were found.

A quartermaster named Murphy, who was thrown into the water when the ship capsized, managed to get hold of the hottom of No. 15 lifehoat, which was floating hottom up, and then succeeded in scramhling into No. 13. This boat, when full of survivors, went alongside the " Storstad," put them on hoard, and then returned and picked up ahout thirty more people, who were taken to the " Eureka." After that No. 13 was cast adrift, as no other living persons were to he found.

One of the hoats, number unknown, appears to have been struck hy some of the superstructure giving way as the ship capsized, the people in her being either killed or drowned.

One of the " Empress of Ireland's " collapsihle boats also got away, and went alongside the " Storstad " with survivors. She was then manned by men from the " Storstad " and was the means of saving more lives.

Although there is no direct evidence, it is very prohahle that some lives were lost owing to injuries sustained at the moment of the collision, and also when the port hoats and other movahles crashed across the deck, sweeping everything hefore them.

Life-saving by the " Storstad."

After the collision, the " Empress of Ireland " and the " Storstad," having separated, lost one another in the fog. The Master of the latter sent the mate forward to ascertain what damage had been sustained hy his vessel, sounded the whistle, and called all hands on deck. The " Storstad " was turned under port helm until she was a little east of Father Point, and heading inshore. However, cries heing heard, the engines were put slow ahead and the helm starhoarded, and the vessel proceeded until the outline of the " Empress of Ireland," which was on the point of foundering, was seen. The " Storstad " was then manœuvred into a position near the people in the water, and four hoats were lowered. These hoats made many trips, hringing survivors back each time, and the work was continued as long as any living person could he discovered in the water.

One of the collapsihle hoats of the " Empress of Ireland " manned hy memhers of the crew of the " Storstad " was also the means of saving lives, as detailed in life saving hy hoats of the former vessel.

No complaint can he made of the conduct of those on hoard the " Storstad." They appear to have done all in their power to save life.

Proceedings of Marconi Operators Afloat.

Just prior to the collision, Mr. Ronald Ferguson, the Senior Marconi Operator, had turned in, leaving his assistant, Mr. Edward Bamford, on duty, hut had not gone to sleep. The collision having taken place, Mr. Ferguson went into the instrument room, and, anticipating that he would he required to send out a message for assistance, he at once called up all availahle stations, telling them to stand hy for a distress signal, and thus ensured a clear way to obtain any possihle assistance.

In reply to this call the wireless station at Father Point replied " O.K. here we are."

Mr. Ferguson told his assistant to run to the hridge and ask for orders. However, the Chief Officer then passed hy, and instructed Mr. Ferguson to send out the " S. O. S. " signal, as the vessel was sinking, and the following is in Mr. Ferguson's own words :—

> " So I went and took up the 'phones and called up ' S. O. S.' saying that we had struck something and were ' sinking fast,' and that the ship was listing terribly. I sent it out very slowly, hecause I knew that at that time there would he no senior operators on watch, so I sent it very slowly, to

give the junior operators a chance to understand. Father Point replied, saying " O.K.," and asking where we were. I thought a minute, for no one had told me the position, but I remembered them putting down the pilot, and I said we were about twenty miles past Rimouski. He then said " Twenty miles," wanting me to confirm it, to show that he had it right, and while I was saying " Yes " the power shut right off, and my handle went back, and I was left without any power, and the lights went out too. By this time I was standing with one foot on the hulkhead and one on the floor, she had listed so terribly, and, of course, all my papers and books were strewn all over. Then I went out on the deck and was holding on to the rail, and was shouting through my hands as a megaphone that there were plenty of ships coming. I saw Mr. Jones, the First Officer, and the Second Officer, and others, attending to the boats, and the Chief Officer came alongside and said : " What's that ?" and I told him. I repeated to him that we should have assistance in less than an hour, and he said to clear to my boat. Then I went back into the cabin to work my emergency to see if I could get another call in. I omitted to mention that Father Point said he was sending the " Eureka " in reply to my call, also the " Lady Evelyn." I got that after my power was shut off. I went to get the emergency gear in working order—and the emergency gear could not be used, the accumulators burst, and the ship was lying on her side practically by this time, and I went outside and got hold of a deck chair that was lying there and intended to jump for it, for I had no belt, and then she gave a sudden lurch and jerked me into the water. But previous to this I had heard a terrible clattering of all the boats from the port side crashing across the deck to the starboard side." Both the Marconi operators were among the saved.

Proceedings of Marconi Operators Ashore.

Mr. Crawford S. Leslie, the operator on duty at the Marconi station at Father Point, states that he received the call from the " Empress of Ireland " at 1.45 a.m. of the 29th of May, and immediately reported same to Mr. William J. Whiteside, the officer in charge, who was in bed. At 1.50 a.m. the " Empress of Ireland " said " Listing terribly : by " meaning " Stand by." Mr. Whiteside, who had at once gone to the operating room, took over charge of the instruments, and heard the last of the " Empress of Ireland's " " S.O.S." calls. He replied that he would send the Government steamers to her assistance, and asked for the position of the vessel. The answer came that she was twenty miles from Rimouski, and the signals from her then trailed off and no further intelligence could be obtained.

Mr. Whiteside took it for granted that the operator on board would still be standing by his receiver, and informed him that the Government steamers " Lady Evelyn " and " Eureka " were being sent to render assistance. He then made the call " C.Q." which is a general signal meaning that all ships hearing it must answer; but got no response.

Mr. Whiteside communicated with the Masters of the " Lady Evelyn,"—which was lying at Rimouski Wharf, and the " Eureka," which was landing a pilot at Father Point, and those two vessels, with the least possible delay, set off for the scene of the disaster.

Assistance rendered by Canadian Government Steamers " Eureka " and " Lady Evelyn."

The Canadian Government steamer " Eureka " took the pilot from the " Empress of Ireland " about 1.30 a.m. according to Captain Belanger, or at 1.20 a.m. according to Captain Kendall, the vessel then being a little to the westward of Father Point Wharf, distant about a mile and a half. After that she waited for the outward bound steam collier " Wagama," took her pilot off also, and proceeded to Father Point. Just as she was touching the wharf—about 2.25 a.m.—her Master (Captain J. B. Belanger) was informed by telephone by Mr. Whiteside and Mr. John McWilliams, Manager of the Great North Western Telegraph Company's station at Father Point, that the " Empress of Ireland " had met with an accident and was sinking. Without any delay, the " Eureka " set out for the scene of the disaster, which she reached in from forty to forty-five minutes. The " Empress of Ireland " had then gone down. Some lives were saved and survivors were received on board from boats, in all to the number of about 150, and everything possible was done to

alleviate their sufferings until they were landed at Rimouski Wharf. The "Eureka" made two other trips, but no living persons could then be found.

The Master of the Canadian Government steamer "Lady Evelyn" (Captain Pouliot) lying at Rimouski Wharf, was informed hy the wireless operators at Father Point that the "Empress of Ireland" was sinking and asking for assistance. He immediately called all hands, got up steam as quickly as possible, and having learned from the Captain of the "Eureka" the approximate position of the ship, left Rimouski at 2.45 a.m. and arrived in the vicinity of the casualty about 3.45 a.m. The "Lady Evelyn" took on board some of the survivors from hoats, and also from the "Storstad," and conveyed them to Rimouski.

PART VI: QUESTIONS.

At the beginning of the Inquiry twenty questions were formulated by the Canadian Government upon special points arising out of the casualty. Many of these questions have already been answered in the foregoing parts of our report; but it will be convenient here to set out the questions in full, and to answer those which have not heen already dealt with.

Question 1: When the s.s. "Empress of Ireland" left Quehec on or about the 28th May last—

(*a*) what was the total number of persons employed in any capacity on board her, and what were their respective ratings?

(*b*) what was the total number of her passengers, distinguishing sexes and classes, and discriminating hetween adults and children.

Answer: (*a*) The total number of persons employed in any capacity on board the s.s. "Empress of Ireland" at the time she left Quebec on the 28th May last was 420. The respective ratings of these persons was as follows:—

Deck Department	59
Engine Department	130
Victualling Department	222
	411
Supernumerary Engineers Ex-R.M.S. "Empress of Asia"	4
Musicians	5
	420

(*b*) The total number of passengers was 1,057, made up as follows:—

——	Male.	Female.	Total.
1st class	49	38	87
2nd class	125	128	253
3rd class	500	217	717

Included in the above figures are:—

4 female children in first class.

11 male and 21 female children in second class, and

54 male and 48 female children in third class.

Total children 138.

Question 2· On leaving Quebec on or about the 28th day of May last, did the s.s. "Empress of Ireland" comply with the requirements of the Merchant Shipping Acts, 1894 to 1906, and the rules and regulations made tbereunder, with regard to the safety and otberwise of "passenger steamers" and "emigrant ships."

Answer: Yes.

Question 3: In the actual design and construction of the s.s. "Empress of Ireland," what special provisions, if any, were made for the safety of the vessel, and the lives of those on board, in the event of collisions and other casualties.

Answer: That has been dealt with in Part I. of our report.

Question 4: Was the s.s. "Empress of Ireland" sufficiently and efficiently officered and manned?

Answer: Yes.

It was suggested to us, however, by counsel on behalf of the National Sailors' and Firemen's Union of Great Britain and Ireland, that more A.B.'s should have been carried on board the "Empress of Ireland." He raised this point not with special reference to this casualty and this vessel, but as a means of placing before the court the general opinion of his clients, that for the purpose of launching and manning lifeboats, all passenger ships should be required by law to carry A.B.'s to the number of two per boat. We do not, however, consider that such a requirement would have been of any avail in saving life on this occasion, and we, therefore, abstain from making any comment on the suggestion.

Question 5: Were the arrangements for manning and launching the boats on board the s.s. "Empress of Ireland" in case of emergency, proper and sufficient? Had a boat drill and a bulkhead door drill been held on board, and if so, when? What was the carrying capacity of the respective boats? What number and description of lifebuoys and life jackets were on board this vessel? Where were they carried? Were they in good condition and adequate for the purpose intended?

Answer: The answer to the first question is in the affirmative. Boat and bulkhead door drills were carried out at Quebec on the 23rd May last before the ship sailed. The rest of the information asked for is given in Part V. of this report.

Question 6: What installation for receiving and transmitting messages by wireless telegraphy were on board the s.s. "Empress of Ireland"? How many operators were employed in working such installations? Were the installations in good and effective working order? Were the number of operators sufficient to enable messages to be received and transmitted continuously by day and night?

Answer: The "Empress of Ireland" was fitted with a Marconi standard one and a half kilowatt installation of wireless telegraphy with a complete emergency gear.

Two operators were on board, and the installations were in good and effective working order, and the number of operators was sufficient to enable messages to be received and transmitted continuously by day and night.

Question 7: At or prior to the sailing of the s.s. "Empress of Ireland" from Quebec on the 28th day of May last, what, if any, instructions as to navigation, were given to the Master, or known by him to apply to her voyage? Were such instructions, if any, safe, proper and adequate, having regard to the time of the year and dangers likely to be encountered during the voyage?

Answer: General and specific rules as to navigation were issued by the Canadian Pacific Railway Company to their masters and officers in book form, and were well known to the master and officers of the "Empress of Ireland." The instructions contained in such rules were safe and proper, having regard to the time of the year, and dangers likely to be encountered during the voyage.

Question 8: When leaving Quebec, on or about the 28th of May last, was the vessel in charge of a Quebec pilot? If so, when and where was the pilot discharged, and what was the condition of the weather at that time?

Answer: These questions, with the exception of that as to the time at which the pilot was discharged, have been dealt with in the body of our report. As to the time at which the pilot was discharged, the master of the "Empress of Ireland" states that it was at 1.20 a.m. on the 29th May, while the master of the pilot boat states that it was at 1.30 a.m.

Question 9: After the pilot left the s.s. "Empress of Ireland" was a double watch kept on deck?

Answer: Yes.

Question 10: At what time on the morning of the 29th May last—

(*a*) did the s.s. "Empress of Ireland" first sight the light or lights of the Norwegian steamer "Storstad," and in what position was the s.s. "Empress of Ireland" then?

(*b*) did the Norwegian steamer "Storstad" first sight the light or lights of the s.s. "Empress of Ireland," and in what position was the s.s. "Storstad" then?

At this time were the vessels crossing so as to involve risk of collision within the meaning of Article 19 of the Regulations for Preventing Collisions at Sea? If so, did the s.s. "Empress of Ireland comply with the provisions of the said Article

and of Articles 22 and 23, and did the s.s. " Storstad " comply with Article 21 of the said Regulations?

Answer: The two vessels sighted one another shortly after the " Empress of Ireland " left Father Point, and before she changed her course to N. 73° E. Magnetic.

The vessels were not at this time crossing so as to involve risk of collision within the meaning of Article 19 of the Regulations for Preventing Collisions at Sea.

Question 11 : After the vessels had sighted each others' lights did the atmosphere between them become foggy or misty so that lights could no longer be seen? If so, did both vessels comply with Articles 15 and 16, and did they respectively indicate on their steam whistles or sirens, the course or courses they were taking by the signals set out?

Answer: The answer to the first question is in the affirmative.

We are of opinion that both vessels complied with Article 15 of the Regulations for the Prevention of Collisions at Sea. We are further of opinion that the " Empress of Ireland " complied with Article 16; but on the evidence before us, we are not prepared to express an opinion as to whether the provisions of this Article were complied with by the " Storstad."

Question 12: Were the circumstances of this case such as to bring into operation the provisions of Articles 27 and/or 29 of the said Regulations? If so, did the masters of both vessels take prompt and proper means or measures to comply with the requirements of the said Articles?

Answer: The circumstances of the collision, and the causes which brought it about, are described in our report.

Question 13: In what position in the River St. Lawrence, and at what time on the morning of the 29th of May last, did the collision occur between the s.s. " Empress of Ireland " and the s.s. " Storstad "? At what time did the s.s. " Empress of Ireland " founder, and how was it that she sank so quickly after collision had occurred?

Answer: These questions are dealt with in our report.

Question 14: Was proper discipline maintained on board the s.s. " Empress of Ireland " after the casualty occurred?

Answer: Yes.

Question 15: What messages for assistance were sent by the s.s. " Empress of Ireland " after the casualty, and at what times respectively? Were the messages sent out received at the wireless station at Father Point? Were prompt measures taken by those on shore to render assistance? What assistance was rendered by the Government steamers " Eureka " and " Lady Evelyn "?

Answer: A wireless message " S.O.S." was sent off by the senior Marconi operator shortly after the collision had occurred; the message was received at the wireless station at Father Point, and no time was lost in sending the Government steamers " Lady Evelyn " and " Eureka " to the rescue. The vessels proceeded at once to the scene of the disaster and picked up many of the survivors, landing them at Rimouski.

Question 16: Was the apparatus for lowering the boats on the s.s. " Empress of Ireland " at the time of the casualty in good working order? How many boats were got away before the vessel sank?

Did the boats, whether those under davits or otherwise, prove to be serviceable for the purpose of saving life? If not, why not? What steps were taken immediately on the happening of the casualty? How long after the casualty was its seriousness realised by those in charge of the vessel? What steps were then taken? Were all water-tight doors in bulkheads immediately closed? What endeavours were made to save the lives of those on board, and to prevent the vessel from sinking?

Answer: At the time of the casualty the apparatus for lowering the boats on board the " Empress of Ireland " was in good working order.

The second part of this question has already been answered in the body of the report.

Question 17 : Were any of the persons on board the s.s. " Empress of Ireland " who lost their lives killed or injured by the collision?

What number of passengers and crew left the ship in the boats which got away?

How many persons were ultimately rescued, and by what means? What was the number of passengers, distinguishing between men and women, and adults and

children, of the first, second, and third classes, respectively, who were saved? What was the number of the crew, discriminating their ratings and sex, who were saved?

Answer: We have not before us sufficient evidence to enable us to answer the first question.

Of the total number of 1,477 persons on board the "Empress of Ireland" 465 were saved (1) in the vessel's own boats, (2) boats belonging to the s.s. "Storstad," and (3) the Government steamers "Eureka" and "Lady Evelyn."

The number of passengers saved, distinguishing between men and women, and adults and children, were as follows:—

First Class.

Total number:		Saved.
Adult males	49	24
Adult females	34	11
Children, males	—	—
Children, females	4	1
Total	87	36

of which number were saved.

Second Class.

Total number:		Saved.
Adult males	114	33
Adult females	107	13
Children, males	11	—
Children, females	21	2
Total	253	48

of which number were saved.

Third Class.

Total number:		Saved.
Adult males	446	115
Adult females	169	17
Children, males	54	1
Children, females	48	—
Total	717	133

of which number were saved.

Of the 609 adult male passengers	172	were saved.
„ 310 adult female passengers	41	„ „
„ 65 male children passengers	1	„ „
„ 73 female children passengers	3	„ „
Total 1,057	217	„ „

The total number of crew saved was 248, as follows:—

Total number:		Saved.
Deck Department	59	36
Engine Department	130	92
Supernumerary Engineers, ex "Empress of Asia"	4	3
Victualling Department	212	113
Matron and nine Stewardesses	10	1
Musicians	5	3
Total	420	248

crew saved.

Question 18: Did the Master of the s.s. "Storstad" comply with Article 422 of the Merchant Shipping Act, 1894?

Answer: Yes.

Question 19: Was a good and proper look-out kept on board of both the vessels?

Answer: A good and proper look-out was kept on board the "Empress of Ireland." We are not prepared on the evidence before us to say whether the mistake

made by those in charge of the "Storstad" in thinking that the "Empress of Ireland" was passing port to port was or was not due to an insufficient look-out being kept.

Question 20: Was the loss of the s.s. "Empress of Ireland" and/or the loss of life caused by the wrongful act or default of the Master and First Officer of that vessel, and the Master, First, Second, and Third Officers of the s.s. "Storstad," or any of them?

Answer: This question has already been answered in our report.

PART VII.

SUGGESTIONS.

1. In order to prevent, if possible, disasters such as that into which we have been inquiring, we think that in foggy weather it would be desirable to close all watertight doors and port holes below the top of the watertight bulkheads, and to keep them closed until the fog has completely cleared. We think also that wherever practicable all watertight doors and port holes below the above level should be closed at sunset and kept closed until sunrise.

Precautions of the kind suggested would have the effect of securing the floatability of the ship in accordance with the intentions of the designer, whereas neglect of such precautions may lead to the foundering of a vessel which would otherwise have remained afloat.

2. The rapidity with which the vessel foundered after the collision made the life-saving appliances on board of little use. Most, if not all, of the passengers were in bed when the vessel was struck, and there was an interval of only about fifteen minutes between the collision and the foundering. The list which the vessel took to starboard was so sudden and so great that the lifeboats on the port side were rendered useless almost at once. Some of them were indeed worse than useless for they broke adrift and injured people as they clattered down the sloping deck. Of those on the starboard side only six were launched, although the best was done in the short time available to get them into the water. These circumstances lead us to suggest that it might be desirable to consider whether rafts could not be placed in such a position on the upper deck that they would float automatically on the water as the ship sank. Such rafts would doubtless have to be attached to the deck in such a way as to prevent them from getting adrift in bad weather; but the attachments might be of a simple kind which could be loosened in a very short time.

3. It has not been suggested during our Inquiry that the catastrophe was in any way attributable to the arrangements made by the Canadian Government for the navigation of the St. Lawrence, nor have we any reason to suppose that those arrangements are in any way unsatisfactory; but we suggest that it might be worth while for the Government to consider whether it may not be desirable and practicable to arrange for the picking up and dropping of pilots to be done at different points so that incoming and outgoing ships may, so far as is possible, be relieved of the necessity of crossing one another.

(Signed) MERSEY.
„ E. McLEOD, C.J.
„ A. B. ROUTHIER.

We concur:

(Signed) W. F. CABORNE.
„ L. A. DEMERS.
„ J. J. WELCH.
„ P. C. HOWE.