

(No. 493.)

“BORUSSIA,” (S.S.)

The Merchant Shipping Acts, 1854 to 1876.

In the matter of the formal Investigation held at the Chancery Court, St. George’s Hall, Liverpool, on the 4th, 5th, and 6th of February 1880, before H. C. ROTHERY, Esquire, Wreck Commissioner, assisted by R. C. MAY, Esquire, C.E., Commander KNOX, R.N., Captain HIGHT, and Captain WILSON, as Assessors, into the circumstances attending the loss of the British steamship “BORUSSIA,” of Liverpool, and the loss of the lives of 154 of her passengers and crew, on the 2nd December last, whilst on a voyage from Liverpool to New Orleans, via Corunna.

Report of Court.

The Court, having carefully inquired into the circumstances of the above-mentioned shipping casualty, finds, for the reasons annexed,—

1. That the “Borussia” was not in a good seaworthy condition when she left Liverpool on her last voyage; but that on the other hand there is nothing to show that the cement of the ship’s bottom and round the roses was not in good order, or that the pumps were not sufficient.
2. That the cargo was properly stowed, and its weight properly distributed throughout the ship.
3. That on the morning of the 1st of December all the sea cocks were in proper order.
4. That the leaks were in all probability due to some of the rivets having dropped out, and to one or more of the butts having started or opened in the ship’s bottom in the way of the stoke-hole.
5. That owing to the death of the captain and chief engineer, it is not possible to say whether all proper measures were taken to ascertain the whereabouts of the leak.
6. That owing to the same cause, it is not possible to say whether all possible efforts were made to keep down the water.
7. That, so far as appears, the vessel was navigated with proper and seamanlike care.
8. That the persons leaving the ship in her boats on the 2nd of December did so by the orders of the captain, and that the captain appears to have made every possible effort, without regard to his own safety, to save the lives of those on board.

The Court was not asked to make any order as to costs. Dated the 6th day of February 1880.

(Signed) H. C. ROTHERY, Wreck Commissioner.

We concur in the above report.

(Signed)	HENRY KNOX,	} Assessors.
	Commander R.N.,	
„	J. P. WILSON,	
„	EDMUND HIGHT,	
„	ROBERT C. MAY,	

Annex to the Report.

This case was heard at Liverpool on the 4th, 5th, and 6th February 1880, when Mr. Squarey appeared for the Board of Trade, and Mr. Kennedy for the owners of the “Borussia.” Twenty-one witnesses having been produced by the Board of Trade and examined, Mr. Squarey stated that the Board of Trade desired the opinion of the Court upon the following questions:—

- “1. Whether, at the time she left Liverpool, the “Borussia” was in good and seaworthy condition throughout? Whether the cement of the ship’s bottom and around the roses was in good order, and the pumps sufficient?
- “2. Whether her cargo was properly stowed, and its weight properly distributed throughout the ship?
- “3. Whether on the morning of the 1st December all the sea cocks were closed?

- “4. What was the cause of the leak, and where was it?
- “5. Whether proper measures were taken to ascertain its whereabouts?
- “6. Whether every possible effort was made to keep the water under?
- “7. Whether the vessel was navigated with proper and seamanlike care?
- “8. Whether the persons leaving the ship in her boats on the 2nd of December did so by the orders of the captain, and was every effort made to save the ship and the lives on board?”

Three witnesses having then been produced on behalf of the owners and examined, the Court, after hearing counsel, proceeded to give judgment on the questions on which its opinion had been asked. The circumstances of the case are as follow:—

The “Borussia,” which was an iron screw steamship, belonging to the Port of Liverpool, of 2,075 tons gross and 1,320 tons net register, and was fitted with engines of 300 horse-power, was built at Greenock in the year 1855, and at the time of her loss was the property of the Mississippi and Dominion Steamship Company, Limited, Mr. Thos. Main, of No. 24, James Street, Liverpool, being the managing owner. She left Liverpool on the 20th November last for New Orleans, via Corunna and Havana, with a crew of 55 hands, 65 passengers, and a general cargo of about 638 tons. She seems to have made a quick passage to Corunna, and arrived there on the 23rd, having had strong easterly and north-easterly breezes all the way; and having there taken in a small quantity more of cargo and 60 passengers, she left on the 25th of November for Havana. Up to the 30th the weather appears not to have been bad, for although some of the witnesses say that it was very severe, the seamen describe it as only a moderate breeze. But on the morning of the 30th November the wind, which had before been from the west, backed round to the eastward, and blew a hard gale, and the vessel’s topsails were carried away; but in about six hours the wind again moderated, although there was still a heavy cross sea, and the vessel laboured and rolled considerably.

At 8 a.m. of the 1st of December the second engineer went off duty, and he has told us that at that time there was no water either in the engine-room or in the stoke-hole, nothing more than usual. He was relieved by the fourth engineer, who told us that he observed, soon after he had gone on duty, that there was water in the stoke-hole, and he accordingly put on the bilge pumps to clear it out, but finding between 10 and half-past that it was gaining upon them, he called the first and second engineers; the latter of whom told us that on going down they found 3 feet of water in the stoke-hole. At this time the engine-room was quite clear, as was also the after hold; and at no time, so far as appears, was there any water in either the main or the fore hold. Finding that the bilge pumps would not clear the stoke-hole, they set on the donkey pump, and opened the cock between the stoke-hole and the engine-room to allow the water to run through into the engine-room, and at the same time began baling the water out of the stoke-hole, and pouring it down into the bilges of the engine-room, whence it ran away through the sluice into the after hold. From time to time the pumps were choked, they had, however, no difficulty in clearing them; but at about 3 o’clock p.m. the stoke-hole plates were washed up. Before this an attempt had been made to set on the bilge injection so as to clear the engine-room, but from some cause or other it would not work. Between 7 and 8 o’clock the same evening all the fires were put out, and although they were relighted they were very soon washed out again; and thereupon the donkey pump was rigged as a hand pump. Between 10 and 11 p.m. the after deck pumps were rigged for the purpose of clearing the after hold, and finding that the water was still gaining on them they commenced baling. The pumping and baling continued all through the night, the water gaining upon them all the time, and accordingly at about 11 a.m. the captain ordered the boats to be got ready, and to be provisioned and watered; and at about half-past 12, there being then from 10 to 11 feet of water in the engine-room, orders were given to swing them out.

It seems that the vessel had seven boats, namely, four lifeboats, two cutters, and a gig, four of which were on the starboard and three on the port side. The boats on the starboard side were first swung out, lowered into the water, and passed astern, then the port boats were lowered, but in

doing this one of them was swamped alongside. They seem to have had considerable difficulty in inducing the passengers to get into the boats, they no doubt thought that with such a sea as was then running the ship was a safer place. The first boat to get off was the chief officer's boat, with some 13 or 14 persons in her, including two ladies and a boy or a girl. We were told that the chief officer and some eight or nine of the hands got from this boat into the captain's gig, but the facts are not very clear, and both these boats have been lost. The next boat to get off was the third officer's boat with 13 or 14 persons, all apparently belonging to the crew. On getting from out of the shelter of the vessel she seems to have been driven away to leeward, but having got out the oars they pulled back to the ship, and were then hailed by the captain to go after a boat, which had got adrift with two of the hands in her. They accordingly did so, and having passed a rope to her they endeavoured to tow her back to the ship. Finding, however, that it was not possible to do this, the mate and seven of the hands got into her, and having passed a rope to the former boat they attempted to tow her, but whilst doing so a heavy sea struck both boats and nearly filled them. The crew of the boat in which the third officer was were accordingly obliged to cast off the other boat, and to set to work to bale their own boat, and whilst so employed they drifted away to leeward before the wind and sea. By the time they had cleared her they were at such a distance from the vessel that it was deemed useless to attempt to return to her, and they continued to run before the wind and sea until the 5th, when they fell in with a vessel called the "Mallowdale," which took them on board, and afterwards landed them at Queenstown. What became of the boat which they had been obliged to cast off we do not know, but she was probably lost. Another boat with six hands and five passengers also got away from the ship, and was picked up also on the 5th December by an Italian harque called the "Giacomino," which landed them at Baltimore on the 3rd January following. The crew of this boat speak in the highest terms of the kindness with which they were treated on board the "Giacomino," and a letter has been read by Mr. Squarey, in which it is said that not only did the master of this Italian vessel treat them with the greatest kindness, but he refused to accept any compensation for their maintenance during the time that they were on board his vessel. One other boat also got away with five Spanish passengers, and was fallen in with by a vessel called the "Fulda," which subsequently landed them at Liverpool, but we have no details as to the circumstances under which this boat left the ship. The other boats as well as the vessel herself have never since been heard of, and there can be little doubt that the rest of the passengers and crew have all perished. It would seem, therefore, that out of a crew of 55 hands all told 16 only have been saved, and out of 125 passengers only 10.

The first question on which the opinion of the Court has been asked is, "Whether at the time she left Liverpool the 'Borussia' was in good and seaworthy condition throughout? Whether the cement on the ship's bottom and around the roses was in good order? and the pumps sufficient?"

Now it is admitted that from Liverpool to Corunna the weather was favourable; they had strong easterly and north-easterly breezes, and made a very quick passage. After leaving Corunna some of the witnesses, mostly the landsmen, say that the weather was very severe, but all the seamen describe it as by no means bad until the 30th of November. Thus Henry Brown, the boatswain's mate, told us that they had fine weather and only moderate breezes till about noon of the 30th of November, and this man has been 32 years at sea. John Lewarn, one of the quarter-masters, said that nothing particular happened until the 30th, when they had a gale of wind, which lasted for only a few hours. James Dixon, another quarter-master, who had been about two years in the ship, said that the weather was not bad until after the 29th. And William Baines, an able seaman, told us that they had very good weather until the 30th. The witnesses also say that the gale of the 30th lasted for only a few hours, and that it moderated again in the evening, and from that time no doubt there was a heavy cross sea running. Still it is quite clear from the evidence of the witnesses that there was nothing so bad, so exceptionally severe in the weather, that a good seaworthy ship should not have been able to withstand it. This being so, it may be well to know something of the previous history of this vessel.

The "Borussia," it seems, was built in the year 1855 by Messrs. Caird & Co., of Greenock, for a Hamburg company, to run between Hamburg and New York, and in the year 1876, at which time she was 21 years old, she was

bought by her late owners, the Mississippi and Dominion Steamship Company, Limited. The price given for her by the company was only 15,000*l.*, and although they tell us that they then spent 5,000*l.* upon her, it is needless to say that it was an extremely low price to give for such a vessel, seeing that she had a gross tonnage of 2,075 tons, and that in 1871 she had had new compound engines, built by Day & Co., of Southampton, put into her. We are told that she was not classed at Lloyd's, and what is rather remarkable is that this is the only vessel belonging to the company (who own 12 large Transatlantic steamers) which is not classed 100 A 1 at Lloyd's. Mr. Main told us that they had never attempted to class her, although he admitted that to have a vessel classed 100 A 1 at Lloyd's would be a very great advantage to the owners; but, if so, we are somewhat at a loss to understand why no attempt was ever made to class her. The only conclusion to which we can come is either that they knew they could not have got her classed, and, therefore, did not attempt to do so, or they were unwilling to incur the expense which would have been necessary to bring her up to the requirements of Lloyd's, otherwise I cannot understand why they should have deprived themselves of that which they consider to be a very great advantage. We are also told that at the time of her loss she was valued at the sum of 20,000*l.*, being the total of the cost price and of the amount spent upon her, no allowance apparently having been made for wear and tear during the four years that they had been running her, and that she was insured in different companies for 15,000*l.* From the time they purchased her the company seem to have put her into the same trade in which she was engaged when lost; at all events, we find that in May or June 1878 she was at Havana, and that she proceeded thence to New Orleans, and then home to this country. But however this may be, she was taken up by the Government in March 1879 to convey troops to Natal, and on her return from that voyage she was docked and repaired, and in September left for New Orleans, via Corunna and Havana, and was going out a second time when she met with the casualty which forms the subject of the present inquiry. Such, briefly, is a history of the vessel's proceedings during the time that she has been in the possession of the Mississippi and Dominion Company.

Now it was contended on behalf of the owners that, so far as they were concerned, they had taken every possible precaution to ensure the seaworthiness of the vessel, that they had caused her to be carefully examined by their own officers on every occasion of her return to port; that she was regularly surveyed by the Board of Trade surveyors at Liverpool when she obtained her six monthly certificates, that she had been surveyed by the Admiralty authorities in March last, when she was hired to convey troops to Natal, and that she was examined by the emigration officer just before her departure in November last, and that all these gentlemen had given her the highest character for seaworthiness. In support of these statements we have had the following witnesses produced before us, namely, Mr. Glover, the company's consulting engineer, Mr. Wardlaw, his deputy, and Mr. Lemon, their foreman shipwright; Mr. Thomson and Mr. Bushby, engineer and shipwright surveyors to the Board of Trade at Liverpool, the former of whom surveyed her in July 1877, in March 1879, and again partially in September and November last, and the latter surveyed her in July last, also Captain Brownlow, of the Transport Department of the Admiralty, and Mr. Farrant, the chief engineer of H.M.S. "Resistance," both of whom surveyed her in March 1879; and lastly Captain Burnahy, the emigration officer who inspected her equipments previous to her sailing in November last. All these witnesses, as I have stated, speak very favourably of her seaworthy qualities. Whilst, however, we are quite prepared to put the utmost reliance on the evidence of every one of these gentlemen, it is necessary to inquire what means they had of judging of the seaworthiness of this vessel, and as to the state and condition of the engine-room compartments and especially of the stoke-hole, for by the testimony of all the witnesses it was by the stoke-hole that the water entered, all the rest of the ship being at first quite clear.

And, first, as regards the company's officers, what does Mr. Glover, the company's consulting engineer, say. He told us that he examined the whole of the machinery including the pumps and sea cocks, and that it was all in first rate working order; but as to the hull of the ship he said that he knew nothing about it, it was not within his department. Mr. Wardlaw was Mr. Glover's deputy, and of course would not have any wider or more extensive duties than his principal; and if it was not Mr. Glover's duty to see to the state of the vessel's hull, the cement and plates in the bottom, it would hardly be Mr. Wardlaw's duty to do so. Then we have Mr. Lemon, the company's foreman

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shipwright, who told us that it was his duty to examine her inside and out, all except the engine-room, with which he said that he had nothing to do, his words were "it is not my duty to look to the skin of the ship in the engine-room department or in the coal bunkers;" he considered that that was the engineer's duty. So far then as the officer's of the company are concerned we are in this position, that it was the duty of Mr. Glover and Mr. Wardlaw to see that the machinery was kept in good order, and of Mr. Lemon to see that the vessel's hull was in a seaworthy condition in every part except the engine-room department, but there seems to have been no one whose duty it was to see that the cement and skin of the ship in the engine-room and the stoke-hole were in good order, except perhaps the engineers of the ship, who would, we are told, report it if they saw anything wrong. As regards the Board of Trade surveyors, Mr. Bushby and Mr. Thomson, they no doubt say that they examined every part of the vessel, including the skin of the vessel in the engine-room and stoke-hole, before granting their certificates, and we are quite prepared to believe that they did so; but there is a part of their evidence to which I will presently call attention, and which seems to throw a good deal of light on the cause of this casualty. As to Captain Brownlow, the Admiralty officer who surveyed her in March 1879, he admits that he did not examine her so critically as he would have done had he not known that she had been recently surveyed very carefully by the Board of Trade officers; he says that he did not examine the cement, and that he made only a superficial survey of her. Mr. Farrant, the engineer of the "Resistance," does not pretend to have looked at the hull of the vessel in any part, he only looked at the machinery. Lastly, we have Captain Burnaby the emigration officer, who could speak only of the vessel's equipments, her boats, accommodation for passengers, and such like; but he could say nothing about her seaworthiness. So that of all these witnesses the only persons who could really speak to the soundness of the vessel's bottom in the engine-room department were the two Board of Trade surveyors; let us see therefore what they say on the subject.

Before, however, I proceed to call attention to their evidence it may be well to refer to that of a person named George Gray, who was produced towards the close of the inquiry, and who spoke to a fact which in our opinion has a very important bearing on the case. He told us that in the month of May or June 1878 he was donkey man on board the vessel, which was then lying at Havana; that he was in the stoke-hole, when some of the trimmers went down into the bilges for the purpose of scraping them out; but that they had not been down more than a couple of minutes when they came running out saying that the water was coming in. He told us that he went into the bilges and saw the water coming in through holes in the bottom; he said that he could swear to there being three holes at least, how many more he could not say; that they were 1 inch to 1½ inch holes, and had been caused by the rivets having fallen out. It seems that the carpenter then went below and stopped up the holes with wooden plugs, and in that state she proceeded to New Orleans, where a diver was employed to go under her bottom, and having put patches over the holes, passed bolts through them, which were then secured inside. The vessel then returned to this country, but not without some dissatisfaction being expressed by the crew. Gray's evidence as to some of the rivets having dropped out was expressly confirmed, not only by Mr. Glover, but as will presently be seen by one of the Board of Trade surveyors. Let us now see what these gentlemen say about the vessel.

According to Mr. Thomson he surveyed her in July 1877, and on that occasion drilled the plates in some 28 or 30 places, and found the garboard strake to be about 1¼ths of an inch, it had been originally 2¼ths or 1¼ths; and at the thinnest place he found her to be 5ths, where it had been originally 1¼ths; so that, as he told us, here plates had lost only about 1/16th during the 22 years which she had been running. The next report we have is from Mr. Bushby, who surveyed her in July 1878 on her return from the voyage of which the witness Gray spoke. Mr. Bushby told us that on that occasion he ordered 76 or 78 rivets to be replaced in the way of the stoke-hole and under the boilers, and two butt straps to be placed on the garboard strake; according to him some of the butts were gone from repeated caulking, but only two, so much so as to require butt straps. The next report is from Mr. Thomson, who examined her in March 1879, and who tells us that the butts were then so much worn by careless caulking in the way of the stoke-hole that he found it necessary to put six butt straps on the bilge strake.

Here then we have a vessel which was no doubt strongly built, originally the frames as it would seem being only

18 inches from centre to centre, with plating somewhat heavier than usual, and which seems in 22 years to have lost only about 1/16th in thickness. On the other hand, she was at the time of her loss 25 years old, she had been bought by the company for a very small sum, only 15,000*l.*, although she was 2,072 tons gross, and had recently had new compound engines put into her; in 1878 she had shown a tendency to drop her rivets in the way of the stoke-hole and under the boilers; and in 1878, and again in 1879, the butts, whether from careless or repeated caulking, had shown a tendency to give, so that it became necessary to apply butt straps on the garboard and bilge strakes in the way of the stoke-hole. It is clear that under these circumstances very special care should have been taken to see that there was nothing wrong with the bottom of the ship, more especially in the way of the stoke-hole. It seems, however, to have been nobody's duty to do this; Mr. Glover and Mr. Lemon both say that it was no part of their duty, and what they seem to have relied on were the reports of the chief engineer, but he poor man has perished, and we have therefore no means of knowing whether he properly discharged his duty in this respect. In our opinion a company of the standing and position of this ought not to rely simply upon the reports of the engineer of the ship; but having a superintendent engineer and a superintendent shipwright they should instruct them to examine not the holds only, but the engine-room, the stoke-hole, and bunkers, in fact every part of the ship where defects are likely to be found. That the vessel was not seaworthy when she left Liverpool on the 20th of November last is proved by the result; for had she been such weather as she encountered would not, as we have said, have been sufficient to cause her to founder. Looking, however, at the reports which the owners received from time to time from their own officers, as well as from the Board of Trade and Admiralty officials, we are prepared to admit that they may have had a reasonable confidence that the vessel was in a seaworthy condition. At the same time we think that it would have been better had they given somewhat more precise instructions to their superintending officers, that their surveys of the condition of the vessel's skin should not be limited to the holds only, but that they should extend to every part of the ship, and especially to the engine-room and stoke-hole.

As regards, however, the condition of the cement in the ship's bottom, and more especially in the neighbourhood of the roses, there is nothing to show that it was not in good order. The second and fourth engineers, who were saved, and have been examined as witnesses before us, state that in examining the sea cocks and roses, which it was their duty to do, they did not observe that the cement was at all injured. As to the pumps it seems that she had two bilge pumps, each of which was capable of throwing ½ a ton of water a minute; she had also one donkey pump capable of throwing 2/3 of a ton in a minute; she had a bilge injection which could throw 2 tons in a minute; and she had four deck pumps, two forward and two aft, each of which we are told would throw about ½ a ton a minute. There can then be no doubt that she had ample pumping power for a vessel of her size. It happened very unfortunately that the bilge injection, which was alone capable of throwing 2 tons a minute, or more than the two bilge pumps and the donkey pumps together, became disabled from the first. How it happened there is nothing to show; the fourth engineer told us that he examined the rose before starting and found it all right, and he supposed that something must have got into the valve, and thus disabled it.

One fact, however, must be mentioned in connection with this part of the case, and which seems to have contributed materially to the loss of the vessel. It seems that between the stoke-hole and the engine-room, and extending from side to side of the vessel was a bunker having a passage through the middle, the floor of which was very slightly above the level of the stoke-hole plates. The water, as we have seen, first accumulated in the stoke-hole, and until it had risen above the stoke-hole plates and above the floor of the passage of which I have spoken, the only way for it to pass from the stoke-hole into the engine-room was through a stop-cock having a bore of only about 1½ to 2 inches in diameter, and which was quite insufficient to clear the stoke-hole; and consequently until the water rose above the stoke-hole plates, they were employed baling the water from the stoke-hole into the engine-room. Had there been a sluice or a lock of large diameter between the engine-room and the stoke-hole, as there was between the engine-room and after hold, there would have been no difficulty, as the vessel was somewhat down by the stern, in running off the water from the stoke-hole through the engine-room into the after hold, whence

it could have been pumped out by the after deck pumps, and thus possibly the leak might have been exposed. As it was, however, there being no means of running the water off from the stoke-hole except through this small stop-cock and, by baling, the water would go on accumulating in the stoke-hole until it got over the stoke-hole plates which stood some 5 feet or more above the skin of the ship, and it would consequently be very difficult to get to the leak.

The next question on which our opinion is asked is, "Whether the cargo was properly stowed, and its weight properly distributed throughout the ship?" The cargo, we are told, consisted of about 638 tons, of which there were 185 tons of tin, about 200 tons of pig iron, about 43 tons of bar iron, 80 tons of measurement goods, and about 140 tons of chemicals. The whole of the pig iron was placed in the after hold, except about 20 or 30 tons, which was in the fore-hold; the bar iron was in the after part of the steerage just forward of the engine-room bulkhead; the tin plates were on the orlop deck, part of it forward, part aft; the rest of the goods were distributed in different parts of the vessel. There were also about 880 tons of coal, all of which were in the bunkers forward of and at the side of the stoke-hole. We are told that she had not half a cargo, and that not one of the holds was more than about a third full. It was stowed by a regular stevedore named Mack, a person of very large experience, and who is employed by all the best steam companies in Liverpool, Cunard's, Guion's, and Inman's, and others. Looking then at all these facts, the small amount of the cargo, its distribution, the position of the coals in the centre of the ship, and the character of the person employed to do the work, we have no reason to think that the cargo was not properly stowed.

The third question on which our opinion is asked is, "Whether on the morning of the 1st of December all the sea cocks were closed?" By this I presume is meant, not whether all the sea cocks were closed, for if so the engines would have been unable to work, but whether they were all in proper working order, or rather whether the water which got into the vessel did or did not come in through one of them. Now we have the evidence of the company's officers as well as that of the Board of Trade surveyors, that, so far as their knowledge extends, all the sea cocks were in good working order. One indeed, the blow off cock of the donkey boiler, was in March 1879 found to be out of order, and accordingly it was taken off, new composition bolts were provided, as well as a new brass ring to hold the flange to the ship's side; and it was then replaced and securely fixed. It should also be observed that all the sea cocks were, we are told, attached directly on to the skin of the ship, without any intervening pipe, as we sometimes see. The second and fourth engineers, too, whose special duty it would be to see that the sea cocks were in good working order, have told us that they examined them shortly before the water was discovered in the stoke-hole, and that they were then all right.

There is, too, a fact mentioned by two of the firemen which in our opinion sets this point at rest. I should state that the boilers were situated, two on each side, with the stoke-hole plates between them, and in the centre of the ship. Until the water got up to the level of the stoke-hole plates it would wash with the roll of the vessel up the sides of the ship behind the boilers, but without disturbing the plates in the centre. At about 4.30 p.m., however, the water had risen so high in the stoke-hole that it washed up the stoke-hole plates in the middle, at the same time upsetting the men who were standing on them. Patrick Savar, one of the firemen who was in the stoke-hole at the time, said that he then saw the water "boiling up in the centre of the stoke-hole." I was particular in inquiring of him whether he observed this boiling up of the water in the fore or after part, or on either side of the stoke-hole, but he was positive that it was in the centre. Again Peter Quin, another fireman, who was also there at the time that the centre plate was crashed up, said that he saw the water "bubbling up in the centre." From this it may fairly be concluded that the place at which the water was coming into the vessel was in the centre of the stoke-hole. On then recalling the second engineer, we were told that under the stoke-hole plates there were only five sea cocks, one from each of the four main boilers, and one from the donkey boiler, and that all five sea cocks were at the sides of the ship, and that there was no sea cock at all anywhere near the keel. It is clear, therefore, that the water which the fireman saw boiling or bubbling in at the centre of the stoke-hole did not come from any of the sea cocks.

This then brings us to the fourth question, namely, "What was the cause of the leak and where was it?" and on this point it seems to us that there can be very little doubt. Here is a vessel, strongly built no doubt originally,

but 25 years of age, and probably with the rivet holes punched so that if the rivets became reduced at all by corrosion they would have a tendency to drop out. We find, too, that in June 1878 some of these rivets did in fact fall out whilst she was lying at Havana; and that on her return to this country some 76 or 78 were condemned as insecure. We find also that, owing to repeated or careless caulking, the butts were so slack that in July 1878 two butt straps had to be put on the garboard strake in the way of the stoke-hole, and that in the following March six more butt straps were put on the bilge strake at about the same place. What, therefore, is more likely than that in the rolling of the ship after the gale of the 30th of November some more rivets had dropped out, or some of the butts had given way, and that thus the water got into the vessel. This then, in our opinion, was the cause of the leak, and it is strongly confirmed by the fact that the water seems to have come into the stoke-hole from the bottom of the ship at a place where there was no sea cock, and where the rivets and butts had before been found to be defective.

This brings us to the fifth question, "Whether proper measures were taken to ascertain its whereabouts?" We are certainly left in some doubt as to what steps were taken to discover the cause and position of the leak; but here we are met with this difficulty that the chief engineer and captain, with whom the responsibility of taking the proper measures would rest, were both of them drowned. The second engineer, indeed, has told us that, when he was called, and found 3 feet of water in the stoke-hole, he did not think much of it, he thought it was only an ordinary accumulation of water; but how this could be, if what the fourth engineer said is true, namely, that the vessel did not ordinarily make a wine glass full of water it is not very easy to understand; for all the water which would be used to keep the bearings cool would of necessity pass down into the engine-room bilge, and not into the stoke-hole. If, however, it is the fact that there were 3 feet of water in the stoke-hole, and that they thought it was nothing more than an ordinary accumulation of water, and that prompt measures were not taken to discover its whereabouts, blame undoubtedly does attach somewhere.

The sixth question is, "Whether every possible effort was made to keep the water under?" It is not very clear when the donkey pump was set going, but there can hardly be a doubt that when they found that the water was gaining in the stoke-hole they would at once have put it on. It is no doubt much to be regretted that the bilge injection should have become disabled at the first stroke, seeing that we are told that it would throw as much as both the bilge pumps and the donkey pump together; and if it could have been got to act, the bilge injection might have kept the engine-room clear whilst the two bilge pumps and donkey pump could have been brought to bear upon the water in the stoke-hole. And here I must not omit to mention what appears to have been a serious defect in the position of the donkey boiler. It seems to have been placed in the fore part of the stoke-hole in a recess made for it in the forward bunker, the furnace bars being nearly if not quite on a level with the fire bars of the main boilers, so that all the fires would be put out nearly at the same time. Instead of which, if the fire of the donkey boiler had been placed considerably above those of the main boilers they would have had steam to work the pumps for some time after the main fires had been put out. Whether the deck pumps were brought into action as soon as they might have been may also be open to doubt; it does not appear that they were manned until between 10 and 11 o'clock at night, and apparently long after the fires had been put out. Why they were not manned at a much earlier period does not appear; but here again those who could have informed us on the point have been drowned. In default then of their evidence we are not disposed to say that every effort was not made to keep the water under.

The seventh question is, "Whether the vessel was navigated with proper and seamanlike care?" In our opinion she was, and there is nothing that has come out in the course of the inquiry which leads us to think that she was not.

The eighth question is, "Whether the persons leaving the ship in her boats on the 2nd of December did so by the orders of the captain?" and whether "every effort was made to save the ship and the lives of those on board?" In answering this question it is with very great pleasure that we are able to say that nothing could have been better than the conduct of the captain, officers, crew, and passengers, in fact of all on board. No doubt the principal credit for this belongs to the captain, whose conduct on the occasion would no doubt greatly influence the rest. He seems to have remained on deck all the time, giving the necessary orders without apparently a thought for his own safety. It was to his care and example

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no doubt that there was no confusion; that all the boats except one were safely launched, and that they were all properly provisioned and watered, so that those who were fortunate enough to get away in them were able to support themselves for several days until they were picked up. The reason, too, why so few of the passengers were saved appears to have been not because every effort was not made by the captain and officers to get them into the boats, but because they seem to have had a not very unreasonable disinclination to leave the ship, deeming it to be much safer than a small boat, with the wind and sea as it then was. So far as the captain, officers, and crew are concerned

nothing apparently could have been better than their conduct throughout.

The Court was not asked to make any order as to costs.

(Signed) H. C. ROTHERY,
Wreck Commissioner.

We concur.

(Signed)	HENRY KNOX,	} Assessors.
	Commander R.N.,	
"	J. P. WILSON,	
"	EDMUND HIGHT,	
"	ROBERT C. MAY,	

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