"BROOMHALL."

The Merchant Shipping Acts, 1854 to 1876.

REPORT of Court in the matter of the formal investigation held at Westminster on 5th, 6th, and 7th March 1877, before H. C. ROTHERY, Wreck Commissioner, assisted by Captain HOLT, I.N., and Mr. J. R. RAVENHILL, C.E., as Assessors, into the circumstances attending the damage sustained by the ship "BROOMHALL," and her cargo at sea on or about the 11th and 12th days of January 1877.

Judgment.

The Commissioner. The "Broomhall" was a three-masted iron ship of 1,429 tons gross and 1,379 tons net register. She was built at Sunderland, in the year 1874, by Messrs. W. Duxford and Sons, and at the time of the casualty which is the subject of the present inquiry she was owned by Mr. William Storey Crondace, and two others, of Dundee, in the county of Forfar, Mr. Crondace being the managing owner.

She left Shields on the 10th of April 1876, laden with a cargo of from 1,700 to 1,800 tons of coal and coke, bound therewith to Rio. She had a crew of 28 hands all told, including the master and two mates. And she seems to have been, so far as the owners were aware, well and sufficiently equipped in every respect, and was classed 100 A 1 at Lloyd's.

She discharged her cargo at Rio, and proceeded thence in ballast to Calcutta; having there taken in a full cargo, consisting of 1,700 tons of jute and 25 tons of linseed, she left Calcutta on the 27th of September last, bound therewith to Dundee.

On her way through the Bay of Bengal, and as well before as after passing the Cape, she experienced severe weather, and appears to have laboured and strained considerably. Nothing particular, however, occurred until the 9th of January last, when she had arrived in latitude 28° 37′ north, and 37° 27′ west. At 4 p.m. of that day it was observed that she had a strong list to starboard. The vessel at the time was close hauled on the port tack, heading about north-east, with the wind north-north-west to north. The captain immediately ordered the topgallant sails to be taken in; but the list continuing, all hands were turned up, and the topsails were reefed. Finding that she still had a heavy list to starboard, the master ordered the ship to be put on the other tack. This was, however, found to be a very difficult operation, for the vessel having got into the trough of the sea, there hung. In about an hour, however, by cutting away the after braces, and keeping the head sails full, they succeeded in getting her round on the other tack. It was found, however, that she still had a very heavy list to starboard; at the same time there was no water in the well. At midnight, the crew being worn out, the captain sent them below, but he remained with the man at the helm and the look-out man on deck.

It may be well that I should here describe the construction of the ship, and the mode in which the cargo was stowed, as a good deal will turn upon it. She had, it seems, two decks, an upper and a main deck, the height of the 'tween decks being about 7 feet 6, and of the lower hold from 13 to 14 feet. She had only one bulkhead, a collision bulkhead forward, and from thence to the after part of the ship; both in the 'tween decks and in the lower hold the space was quite flush.

In the bottom of the ship were about 150 tons of stone ballast, rising about 11 inches from the bottom. This had been put in with the double object of stiffening the ship and of acting as a kind of dunnage. On this was placed a layer of mats, and then the lower hold was filled up with bales of jute. In the between decks mats were put round the parts where the iron was exposed, and the between decks was then filled up with bales of jute. The linseed was stowed principally in the run of the ship aft.

At daylight of the 10th the captain proceeded to make a careful search for the leak. Finding that on the starboard side three or four tiers of the jute were saturated with water, whilst on the port side the jute was quite dry, and that at the same time there was no water in the well, the captain came to the conclusion that the leakage must be in the between decks, and on the starboard side. The carpenter was accordingly directed to examine the scuppers, and the ports, but could find nothing wrong there. It was therefore resolved to examine the watercloset pipes, to see if the water was coming in through them.

It may be sufficient here to state the vessel had six waterclosets, three on each side, and that the soil pipes passed through the upper deck into the between decks, and had their outlets in the side of the ship about a foot above the main deck. When the vessel was loaded as she was at the time, and was drawing about 19 feet of water, the outlets were awash, or nearly so, but of course the outlets on the lee side would be under water.

With a view to ascertain if the water was coming in at the soil pipes, the captain began to clear away the cargo from the starboard side in the way of the fore hatch; and in the afternoon of the 10th they had cleared the forward pipe on the starboard side, but it was found to be all right. They thereupon began to remove the cargo from the starboard side amidships, and succeeded, we are told, in throwing overboard about 550 bales of the jute. This, however, was a work of very great difficulty, as the bales had to be torn to pieces, being wedged tightly together owing to their having swollen by being saturated with water.

As the cargo was getting heavier and the list to starboard continued, whereas there was as yet no water in the well which they could not readily keep under, the master determined to pass a wire down the pipes of the waterclosets on the starboard side, with a swab attached t prevent the inflow of the water through the outlets. This was effected at about dusk on the 10th.

At daylight of the 11th the operations of clearing away the cargo were resumed, and at about 10 o'clock in the morning they reached the middle pipe on the starboard side; when it was found to be broken completely through, with the exception of about ¾ of an inch at the top; and that a vast body of water was coming through the tube into the between decks. The master accordingly at once cut the pipe, and having obtained a plug, plugged up the outlet, and thus stopped the inflow of the water at that place.

Not content, however, with doing this, he proceeded to get at the pipes of the other four waterclosets, and found that they were all more or less damaged, that on the port side amidships being broken away half round, whilst the rest were weeping and letting the water through, he accordingly cut them and plugged them all, there was but one sound pipe, and that was the one first examined, the forward one on the starboard side; and it remained sound until the arrival of the vessel at Dundee. It took them seven days to get at and plug the five pipes; and in the course of doing it they had to throw overboard something like from 1,400 to 1,500 bales of jute, out of 9,800 bales, the damage sustained by the cargo being between 8,000*l.* and 9,000*l.* On the 6th February the vessel arrived safely at Dundee.

At the termination of the preliminary examination, Mr. Ravenhill, on behalf of the Board of Trade, stated that he had no charge to make against the master, or against the officers of this ship; and we should not be doing our duty if we did not state that in our opinion the master and the officers of this ship behaved themselves admirably under the very trying circumstances in which they were placed. Had they not succeeded in getting the ship on the other tack, in all likelihood she would never have reached this country. We think, too, that the master acted very properly in passing a wire with a swab attached to it down the soil pipe to prevent the inflow of the water. So far then from the master or the officers being open to any charge, we think that they are deserving of the highest praise for their skill and exertions in bringing the ship in safety to this country.

Mr. Ravenhill also stated that he had no charge to make against the owners of the vessel, and in this also we think that he was right. Unlike the owners in a case which recently came before me (the "H. A. Brightman") where, as soon as the owners were informed that there would be no charge preferred against them, they immediately withdrew from the proceedings, the owners of the "Broomhall," although informed that there was no charge against them, have continued to afford the Court every assistance in their power, to ascertain what was the cause of the casualty, and in what way it could best be avoided in future. On the other hand, the owners of the "H. A. Brightman" seemed to think that, so long as there was no charge against them, it mattered not to them whether the ship was seaworthy or not, and whether those whom they sent in her to sea arrived at their destination in safety or not.

60.

But although no charge has been preferred against the master, the officers, or the owners of this vessel, our duty does not end here. We have not merely to decide a simple issue between the parties, or whether this or that person was to blame for the casualty, but we have to find out, if we can, what was the cause of the casualty, whether any means might have been taken to avoid it, and how far it may be possible to avert it for the future.

And first, it is quite clear that the damage to this vessel and her cargo arose entirely from the faulty condition of the soil pipes, and from no other cause. With a view then to discover how the fracture of the pipes occurred, and whether any and what means could be devised for obviating its recurrence, it will be necessary that I should, in the first place, describe with some minuteness the form and construction of the waterclosets and pipes which were on board this vessel.

There were, as I have already said, six waterclosets on board this vessel, three on each side. There were two forward, one on each side for the seamen. Two under the front of the poop amidships, and two in the lobby further aft. They were all on the upper deck, and were all constructed in this way, the soil pipe on leaving the closet passed downwards through the upper deck, into the between decks, and, when within about a foot of the main deck, it bent outwards, terminating at a hole in the ship's side. The pipe, where it passed through the upper deck, was rigidly connected with it by a flange, and the lower end at the outlet was also connected with a flange screwed on to the inside of the plating of the ship. The mouth or outlet of the pipe had no valve either internal or external, but was quite open to the sea. I should add that the diameter of the pipe was from 3 to 3½ inches, and the lead was about $\frac{3}{16}$ of an inch thick, or as we were told by that very intelligent witness Mr. Ramsay, a ¼ of an inch rough, which would be only $\frac{3}{16}$ of an inch in parts.

To protect the pipes from being injured by the cargo, wooden cases were constructed about them, consisting of from 1½ to 1¾ inch plank, the sides being nailed to the cargo battens, with a front piece uniting them.

All the witnesses agreed that the place at which the pipes had broken or showed a tendency to break was within ¾ of an inch of the flange on the side of the ship. They all agreed as to this, and the question which we have to consider is, how this came about? The surveyor at Dundee, who did not go on board the ship until after the pipes had been removed, told us that, in his opinion, the fracture had been caused by the water beating in at the open mouth of the pipe. On the other hand, Mr. Ramsay, the master plumber at Dundee, who removed the pipes, and replaced them with new ones, told us that in his opinion (and his opinion is entitled to very great weight) the fracture was due mainly to what he called the vibration of the pipe, caused by the labouring and straining of the vessel. He told us that in his experience he had often seen not soil pipes but scupper pipes and the pipes of pumps fractured from that cause. He told us that the part at which the fracture would take place was where the pipes had been connected, that it was always weaker there; and that in the present case the fracture had taken place where the connection had been made with the flange on the ship's side. Mr. Bissett and Mr. Sampson, two engineer and shipwright surveyors of the Port of London (gentlemen whose opinions are entitled to every respect), thought that the fracture might have been caused partly by the transverse labouring and straining of the vessel, which they illustrated with a pair of parallels; partly also they thought it might be due to the repeated blows given to the inside of the pipe by the sea entering in at its open mouth.

Now without stating positively how the fracture occurred, for it would be impossible for us to do so, we are inclined to think that it was due partly to what Mr. Ramsay has called the vibration of the tube, an expression to which Mr. Bissett seemed, but in our opinion without any just reason, to take exception, partly also perhaps to what Mr. Sampson and Mr. Bissett have called the transverse labouring and motion of the vessel, and partly to the sea beating in at the open mouth of the pipe. An attempt indeed was made to show that corrosion had taken place at the part where the tube was fractured, but there was no evidence upon which we could rely to show that any corrosion had taken place.

But whatever may be the difference of opinion as to the cause of the fracture, on one point all the witnesses seemed to be agreed, namely, that the lead of which the pipes were constructed was not sufficiently thick. Mr. Ramsay has told us that they were made of rough quarter, as he called it, which in fact would be only $\frac{3}{16}$ thick in parts. He said that in ships of this class sailing out of Dundee they were never less than $\frac{5}{16}$ or $\frac{3}{8}$. That this too was the opinion of the owners is clear from the fact that when on the arrival of the vessel at Dundee the pipes were replaced, $\frac{3}{8}$ pipe was used for the purpose, although the outlet of the pipes was changed from the position in which they had been before to above the upper deck, well out of the reach of the water. If then a thickness of $\frac{3}{8}$ was deemed requisite for pipes well above and out of the reach of the water, it is obvious that in the opinion of the owners, rough quarter or $\frac{3}{16}$ for pipes below the level of the water or awash would not be sufficient.

But apart from the question of the thickness of the lead, there are other circumstances connected with these pipes which lead us to think that they were not such as a vessel of this size and description ought to have been fitted with.

Obviously the best way to prevent water from flowing into the ship, should the soil pipes by any accident break, would be to place them high up, on the ship's sides, so as to be out of the reach of the water, and that is what the owners seem to have done when they renewed them, after the arrival of the vessel at Dundee; but there are some serious objections to having the outlets of the soil pipes so high up on the ship's sides, on the score of cleanliness, and we are not surprised that shipowners should prefer to have them, so that they would be on a level with the water when the vessel was loaded. In that case however it seems to us that the outlets should be protected, for those on the lee side would necessarily be under the water, and if the pipe gives way, as it did in this case, there is the greatest risk of the vessel filling with water and going down.

To meet this danger we were told that it was formerly the practice to put valves on the outside of the ship, but that they were soon knocked away by the vessel rubbing against wharves or other vessels, and that the practice has consequently been abandoned. But we have heard no objection whatever raised to the use of inside valves, that is to say, valves placed in the pipe some 9½ inches. I think Mr. Bissett said from the outside of the ship. Those valves opening outwards allow the soil to pass out, and at the same time they prevent the water from beating against the inside of the tube; and above all they would prevent the inrush of water in case the pipe should from any cause become fractured. We think, therefore, that whenever it is considered desirable to have the outlets of the soil pipes below the surface of the water they should be fitted with inside valves, such as I have stated, and which are commonly called "storm valves."

But here the question arises, that if the soft leaden pipe be continued right up to the flange in the ship's side, a valve of 9½ inches inside the ship would be of little use, for it would be carried away with the pipe, if the pipe broke, as it did in this case within ¾ of an inch of the flange. To obviate this difficulty it appears to us very desirable that the lower part of the pipe should be constructed of some harder metal than lead, that it should be constructed either of iron or gun metal. Mr. Bissett spoke strongly in favour of gun metal, and no doubt gun metal would be better than iron; but we are not prepared to say that an iron tube going beyond the bend in the pipe, say to a distance from the outside of the ship of about 18 inches, would not be quite sufficient for the purpose. What we recommend is that the lower part of the tube, for about 18 inches, should be made of some hard metal like iron or of gun metal, in which the valve would be carried. The upper part of the pipe might be of lead; such a construction would, in our opinion, be all that would be required, so far as the soil pipes are concerned, to secure the safety of the ship.

I now come to another very important point, namely, the casings of these pipes. The casings in this vessel were it seems constructed of 1½ to 1¾ inch planks, and it seems to us marvellous that when the jute got saturated with moisture and swelled, as it has been shown that it did, to the extent even of forcing up the decks, that it did not crush up this frail casing, in that case it would have carried away the pipes entirely. We think that the casings ought to be constructed of some stronger material than 1½ inch plank. Mr. Bissett approved of the suggestion that was made to him, that the casing should be of iron, and he said there could be no difficulty whatever in attaching the sides of the casings to the frames of the ship. He thought that they should be made with screws and nuts, so as to be readily taken down to examine either the pipe itself or the skin of the ship at that part. But Mr. Bissett recommended that the iron casing should be carried from deck to deck. Now this we think would be unnecessary, we can see no advantage in carrying the casing lower down than to a level with the lower part of the outlet, but of course in that case the casing would require to have a bottom to it. It seems to us that there would be this advantage over the plan suggested by Mr. Bissett, that in

61.

case, from any accident, the pipe should leak, there would be only a small space for the soil to accumulate in; whereas, according to Mr. Bissett's plan it would have a large receptacle below the outlet in which the soil might accumulate, where besides being very offensive it might possibly damage the cargo.

We think, then, that to make these soil pipes secure the lower part for about 18 inches from the outlet should be composed of some harder substance than lead, such as iron or gun metal; that in this portion of the tube there should be a valve, opening outwards, so as to prevent the inrush of the water in case by any accident the pipe broke; and lastly, we think that the casing should be constructed, not of wood, but of iron, and should be carried down, not as Mr. Bissett proposed, from deck to deck, but down to the level of the bottom of the outlet. With such a construction we think that every security would be afforded that no damage would be likely to result from the soil pipes.

I must not conclude my remarks without adverting to what fell from Mr. Bruce whilst addressing the Court on behalf of the owners. He stated that although possibly the Court might be of opinion that the arrangements for the soil pipes in this vessel were defective and not up to modern requirements, yet he thought that the owners were not to be blamed on that account, for that they acted to the best of their knowledge, and had left these details to the shipbuilders, trusting that they would make them of the requisite strength for the size of the vessel. Concurring as we do entirely in that view, we think that we should not be doing justice to the owners if we did not say that, in our opinion, their conduct has throughout been most proper. In the first place, when they found out the defective state of the soil pipes, they have replaced them with others to which no possible objections can be taken, and of which a sketch was left with us by Mr. Ramsay. Secondly, although they were told that there was no charge against them, they have continued before the Court, and have given every assistance in their power to discover the cause of the casualty, and how it might best be remedied for the future. They have shown a regard for the lives of their seamen, and so far from their conduct being open to reproach we think that it is deserving of the very greatest credit. At the same time it is to be observed that they have, more perhaps than anyone, benefitted by the present inquiry. And under all the circumstances, therefore, I shall not give any costs.

Mr. Lamb. After what you have just said, sir, I find my mouth almost closed, very much against my will, for I had intended, considering the very exemplary behaviour of the owners, and the very noble conduct of the captain and the officers, to have asked you to exercise that beneficial power which has been wisely placed in your hands, and to make a marked example in this case. It is true, indeed, that the owners have benefitted in common with the rest of the shipowners of this country by the inquiry, but it would be almost as hard, if I may say so, that a shipowner, who was altogether innocent, and who had never had a vessel that had met with any misfortune, should be called upon to contribute anything; but I fear after what you have said that I can hardly hope to alter your decision.

The Commissioner. Your soil pipes were defective.

Mr. Lamb. Yes, they were; but it was not our fault that they were so.

The Commissioner. It was somebody's fault; it was certainly not the fault of the Board of Trade.

Mr. Gainsford Bruce. No, sir; but according to your judgment, I am emboldened to say that it was the fault of those in whom the owners were entitled to confide.

The Commissioner. You can settle that with the builders very much better than the Board of Trade can. I think it a very proper case for inquiry, the damages having amounted to between 8,000*l.* and 10,000*l.*, and it having been almost by a miracle that the vessel and all on board were not lost. I shall give no costs.

Mr. Ravenhill. If the owners had been in default, it would have been my duty to have asked for costs.

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

Finding.

The Court, having carefully inquired into the circumstances of the above-mentioned shipping casualty, finds, for the reasons stated in the annexed judgment, that the fracture of one of the soil pipes on the starboard side of the ship, which caused the damage in this case, was due partly to the working and straining of the ship, and partly to the force of the waves beating into the open mouth of the pipe, and whilst attaching no blame to the owners, master, or officers of the ship for the casualty in question, the Court is of opinion that when the outlets of the soil pipes are under water or awash, the lower parts thereof for a length of about 18 inches should be of iron or gun metal, and that the outlets should be protected by storm valves placed inside the pipes, and at a distance of from 9 to 10 inches from the outside.

The Court is also of opinion that there should be no costs of this investigation.

Dated this 7th day of March 1877.

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

We concur in the above report.

(Signed) G. Trefusis Holt, I.N.,
,, John R. Ravenhill,
} Assessors.

(No. 33.)