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(No. 354.)

"RICHMOND," (S.S.)

The Merchant Shipping Acts, 1854 to 1876.

In the matter of the formal investigation held at the Town Hall, Cardiff, on the 19th and 20th December 1878, before H. C. ROTHERY, Esquire, Wreck Commissioner, assisted by Rear-Admiral POWELL, R.N., and Captain CASTLE, as Assessors, into the circumstances attending the abandonment and loss of the British steamship "RICHMOND," of London, off Finisterre, on the 24th of November 1878.

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 loss of the said steamship "Richmond" was caused by an explosion of coal gas which had been allowed to accumulate in the lazarette.

2. That there is no reason why the coal should not be shipped immediately after it is wrought, provided that proper means are taken to allow the gas to escape.

3. That for about 36 hours before the explosion there was no ventilation at all from the holds, the hatches having been battened down, the ventilating bollards closed, and the hole for the ventilating cowl over the lazarette plugged up.

For his wrongful acts and defaults in neglecting to make use of the means provided for giving ventilation to the holds, and especially for not having seen that the ventilating bollards were in proper working order, but allowed them to remain closed from the time the vessel left until she foundered; for not having replaced the ventilating cowl over the lazarette, after it had been unshipped on the evening of the 22nd, and for not having caused the hatches to be re-opened as soon as they ought and might have been, the Court suspends the certificate of William Parssey, the master of the "Richmond," for six months from this day, but recommends that during the period of such suspension he be allowed a first mate's certificate.

The Court is further of opinion that the vessel was not prematurely abandoned.

The Court makes no order as to costs.

Dated the 20th day of December 1878.

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

We concur in this report.

(Signed) R. ASHMORE POWELL, } Assessors.
" JOHN S. CASTLE, }

Reasons.

The Commissioner—The Court assents with pleasure to the remark which was made by the learned counsel for the Board of Trade, that the witnesses in this case have given their evidence in a very fair and straightforward manner. At first, indeed, there was some confusion, owing to a copy of the register of the wrong vessel having been handed in to the Court. It seems from the list of the British Mercantile Marine that there are two "Richmonds," both belonging to the Port of London, both built about the same time, and both nearly of the same size. There were thus two "Richmonds" in the field, not very unlike one another; and unfortunately the copy of the register which was brought in related to the wrong "Richmond." This mistake, however, has been this morning cleared up.

It appears that the "Richmond" with which we have to deal in this case was a vessel of 406 tons gross and 694 tons net, and was fitted with engines of 110 horse-power, and that she was the property of Messrs. Dixon and Harris, of 81, Gracechurch Street, London, Mr. James Dixon, jun., being the managing owner.

In November last the vessel left London, where she had then been recently docked, for Penarth, and having on her arrival at that place taken in a cargo of 1,233 tons of South Wales coal, she left on the 19th of the same month, bound for Malta, and having a crew of 20 hands all told. All seems to have gone well until the afternoon of the 22nd of November, at which time she was nearly across the Bay of Biscay, when a gale sprang up which obliged them to ease her engines, and a heavy sea having set in, the hatches, which till then had remained open, were put on and securely

battened down. On the afternoon of the 23rd the wind moderated, although the sea still continued high, and they were able to set the engines on again at full speed. At 7.30 a.m. of the 24th the captain and chief officer were in their berths. It was the second mate's watch on deck, but he was at the time below in the cabin, looking after his sextant for the purpose, if an opportunity offered, of taking an observation of the sun, when an explosion took place in the after hold. On the captain jumping up and going out of his cabin he found the steward sitting down on the grating just outside the cabin door, very severely burnt, and on hearing that the cook was in the lazarette, steps were immediately taken to get him up, and he was brought on deck also severely burnt.

Finding that there was a great deal of smoke coming up from the lazarette in the stern of the ship, as well as from the officers quarters abaft the engine-room, the master ordered the hose to be brought from forward, and water to be turned on; and in about half an hour they succeeded in getting the fire under, so that they were able to go below. On descending with the chief engineer into the lazarette the master observed that the bulkhead which separated it from the cargo portion of the 'tween decks had been blown out of shape; and what was of much more consequence, that some of the rivets that fastened the plates to the angle irons had been blown away, and that the water was coming into the ship. On looking down into the after peak, which was below the lazarette, he saw further damage, and that the water was also pouring in there. He accordingly closed the after peak to prevent the water getting into the ship that way, and stopped up as well as they could the leaks in the lazarette caused by the rivets and plates having given way. The pumps too, of which the vessel had three worked by steam and two by hand, were set to work; but as none of the suction pipes led down into the after hold it was necessary, in order to pump the water out of the after hold, to let it into the engine-room, and for that purpose the sluices were opened. At first they thought that they were gaining upon the water, but after a short time it gained upon them. The chief engineer has told us that, not being able to sound the after hold, he knocked out a rivet about 4 feet above the floor; and at that time the water had not risen in the after hold to that point, but that on its shortly afterwards coming through that hole he knocked out another rivet about 9 feet above the floor, and after a time the water came through that also, showing that it was rising rapidly in the after hold. It also appears from the evidence of the witnesses that some of the ship's plates in the after hold must have been blown out by the explosion, for they told us that they could see the cargo running out of her.

Finding, between 11 and 12 o'clock, that all their efforts to keep the water under were useless, and that the lower after hold was quite full of water, and that the vessel was rapidly settling down astern, the master determined to abandon her. The boats were accordingly put over the side, and the injured men, viz., the cook, the steward, and the second mate, who had also been severely burnt, were first put into them, and then all the hands got in, and proceeded to a steam vessel called the "Nelly Wise," which had very fortunately come up, and were taken on board and by her brought to this country.

The opinion of the Court having been asked as to what was the cause of this casualty, it is in the first place essential for this purpose that we should have a correct knowledge of the form and construction of the vessel.

From a drawing made by the chief mate, and which has been laid before us, it appears that the vessel had her engines amidships, with two holds, one before the other abaft the engines, and separated from them by watertight bulkheads. Both the fore and after holds were divided by a deck into upper and lower holds, and there were two hatches to the fore hold, but only one to the after hold. The forepart of the after 'tween decks was divided off from the hold, and formed the engineers and officers berths and mess room. The after part was also partitioned off and formed the lazarette, running back aft to the frame of the ship. The officers quarters, as also the lazarette, were separated from the cargo space by bulkheads, the former being close rebated, whilst the latter was formed of rough boards with interstices of a quarter of an inch between the planks, and had a door in it to enable them to take the provisions down through the after hatch into the lazarette. On the deck was the saloon and captain's cabin; and the only access to the lazarette was through a hatchway in the passage leading from aft to the saloon, and placed within a foot or two of the outer door. Under the lazarette was

as I have said, a watertight compartment, which the captain called the after peak.

From the evidence of the foreman coal trimmer and of one of his men, who have been examined before us, it would seem that both the lower holds were full of coal, the fore 'tween decks was also pretty full, but in the after 'tween decks the coal had been trimmed up against the forward bulkhead which separated the cargo space from the officers berths and mess room, and it sloped away aft from the hatch to the foot of the after bulkhead, thus leaving a large empty space immediately forward of the bulkhead of the lazarette. This was done, we are told, by the mate's desire, the object being to enable them to pass the provisions down through the after hatchway and into the lazarette by the door in the bulkhead of which I have spoken.

Now the coal with which this vessel was laden was all South Wales steam coal, supplied by the Ocean Steam Coal Collieries Company, who, we are told, own about 4,500 acres of this coal. The total quantity put on board as cargo was 1,233 tons, of which about 450 tons were put into the after hold, the remainder being in the fore hold. From a return which was given in by Mr. Riches, the managing partner of the company, it seems that something like 400 tons of this coal had been wrought on the 15th of November and was shipped in the vessel on the 16th; that about the same quantity had been wrought on the 16th and was shipped on the 18th; and that the remaining 400 tons or thereabouts were wrought on the 18th and were shipped on the same day, with the exception of a small quantity which was not shipped until the morning of the 19th. This was in addition to 152 tons of bunker coal, which had been wrought on the 18th and was shipped on the 18th and 19th. All the coal, therefore, which was on board this vessel, was fresh or newly wrought coal, and in a condition to give off large quantities of gas. I may add that according to the coal trimmers the last portion of the shipment, and consequently that which had been last wrought, was placed in the after hold.

Let us now proceed to inquire what means there were of ventilating these holds. It seems that over the fore hold there were two ventilating bollards, standing some $2\frac{1}{2}$ to 3 feet above the deck, and the same over the after hold; but in three of them the cap or screw which closed the orifice had become rusted in and could not be moved; the key, too, for unscrewing them had been lost, so that for any purposes of ventilation these so-called ventilating bollards were quite useless, and as a fact they were all closed when she left Penarth and were not opened before the vessel foundered. This was the only means afforded for ventilating the holds except through the hatchways. There were also two ventilating cowls standing some 7 or 8 feet above the deck, one of which was over and was intended to ventilate the officers berths and mess room; the other was fixed just abaft the saloon and captain's cabin, and was intended for the ventilation of the lazarette. This latter, however, became unshipped some time during the evening of the 22nd, and instead of replacing it the master ordered the hole to be plugged up, and from that time there was no ventilation of any kind either from the lazarette, or, as I have already observed, from either of the holds.

It is hardly necessary, after the numerous inquiries which we have had into cases of explosion of coal gas, to enter at any detail into the very dangerous character of the gas which is given off by these coals, or the very serious consequences that may result therefrom, nor should I do so were it not for the real or assumed ignorance which has been shown by the master in this case. From the information which has been laid before the Court in previous cases, as well as from the evidence given in this by the managing partner and the manager of the colliery from which the coal came, as well as by Mr. Wales, the experienced inspector of coal mines for the south Wales district, it is abundantly established that this coal, in common with all South Wales steam coals, is of a very fiery character as they call it. This, however, is one of its chief recommendations, one of the qualities for which it is so much sought after for steam purposes: It has, we are told, a tendency to give off gas in large quantities for some time after it has been wrought, and when it has been broken up, as it necessarily would be on being thrown down into the hold of a vessel. Now the gas so given off, when mixed in the proportion of one part to from six to 16 parts of atmospheric air becomes a highly explosive compound, the force of explosion being greatest when mixed with from 10 to 12 parts of atmospheric air. Another property of this steam coal is that it contains a very small quantity of sulphur. Mr. Jenkins, the manager of the Ocean Steam Coal Collieries, told us that the proportion of sulphur in the coal supplied by their company

was only .0765, so that the gas given off by this coal is quite inodorous, which is, of course, a very serious element of danger.

Whilst, however, this coal gives off, as I have stated, gas in such large quantities, and of so dangerous a character, it readily passes off if it is allowed free access to the air, its specific gravity being only .55. Thus we find that in mines this gas always lodges in the cavities of the roof, and in ships between the beams; in fact it will always lodge in the highest part, its specific gravity being only one half that of air. And although no doubt it would tend very greatly to facilitate the escape of the gas, if a free current of air was made to pass over the surface, all that seems to be necessary is free access to the air.

Mr. Wales, indeed, seemed to think that it might be necessary to have something more than free access to the air; he thought that a fan or something of that kind would be necessary to remove the gas from the hold of a ship. But he was not supported in that opinion by Mr. Riches, the managing partner, or by Mr. Jenkins, the manager of the Ocean Steam Coal Collieries, or by Jenkin Lewis, the foreman coal trimmer, who had been a coal trimmer for 18 years, and foreman coal trimmer at Penarth for 10 years. They all told us that this gas readily escapes into the open air, and that no expensive machinery is at all necessary for the purpose of expelling it from the hold of a ship. Indeed, Jenkin Lewis, the foreman coal trimmer, told us that in his experience of 28 years he had never known an instance of an explosion on board a vessel when the hatches were open; he said that so long as the hatches were open an explosion of gas was impossible. At the same time we are quite prepared to admit that an aperture at one end, and another aperture at the other end of the hold, by creating a current of air over the surface, would no doubt facilitate the escape of the gas; but this is all that is needed; no expensive or complicated machinery, nothing in fact but an aperture or apertures for the gas to escape into the open air.

Let us now for one moment consider what was the condition of this vessel. She had on board a cargo of 1,233 tons of newly wrought South Wales steam coal, of which about 450 tons were in the after hold, and about 800 tons in the fore hold. The hatches separating the lower from the upper holds were off. In the after 'tween decks, just forward of the bulkhead of the lazarette, was a large empty space, sloping down from the hatchway to the foot of the bulkhead. After the 22nd, when the hatches were battened down, there was no ventilation of any kind to either of the holds, and the ventilator of the lazarette had been unshipped, and the hole plugged up. What then more natural than that the newly wrought coal in the after hold would give off gas? That that gas would accumulate in the empty space in the 'tween deck forward of the bulkhead of the lazarette, pass through the intervals, which, we are told, existed between the rough boards forming that bulkhead, and thus fill the lazarette? All then that would be necessary would be to bring a flame in contact with this inflammable gas, and an explosion must of necessity follow.

The next point which we have to ascertain is, whence came the flame which caused this gas to explode? for without it, notwithstanding what was said by two of the witnesses as to its having been the result of spontaneous combustion, it could not possibly have exploded. From the evidence of the cook, who has been examined before us, it seems that just before the explosion he had gone down into the lazarette for the purpose of getting some flour. He said that it was the duty of the steward to see that he only took what was required, and that for that purpose the steward generally went down with him. The cook also told us that, knowing the place well, having been on board the vessel for a considerable time, and knowing where the flour was kept, he went down without any light. He told us that whilst he was down below, and before he had got the flour, he heard a hissing sound, that he threw himself down on the floor, and immediately afterwards an explosion occurred. Where the steward was at the moment of the explosion he could not say. All that we know for certain is that he was found immediately afterwards sitting on the grating just outside the cabin door, and within a few feet of the hatch leading down into the lazarette; and the carpenter has told us that he afterwards found on the deck, close by where the steward had been sitting, a brass candlestick, just such an one, he told us, as would be used to go down into the lazarette. Although then we have no positive evidence as to where the flame came from which ignited the gas, we can form a tolerably shrewd guess. It was the steward's duty to go down into the lazarette to see that the cook took only what was required, a candle is afterwards found on the deck close to where the steward was immediately after the explosion; is it not very probable

that the steward was following the cook down with a light when the gas exploded? And this, too, is confirmed by the fact that he was burnt more severely about the lower part of his legs than elsewhere, showing that in all probability his legs were already in the hatchway when the explosion took place. The steward, we are told, denies that he had any light with him, but the circumstantial evidence is very strong against him. The poor man is still in the hospital, and very ill, and I thought that there would be no use in examining him, for no doubt he would deny that he had had any light, and to press him by cross-examination in the state in which he is would be cruel. Nor did it appear to me to be at all necessary after the evidence we already have. We have no doubt that the steward had a candle in his hand, and that he was going down when the gas, which had accumulated in the lazarette, exploded.

What we have now, therefore, to consider is, who is responsible for this casualty? It was said by Mr. Stephens, who has appeared for the master, that little, if any, blame rests with the master for not having seen that proper means of ventilation were provided for this vessel; that the principal responsibility for the omission would rest with the owners. Whether any responsibility rests upon the owners, it is, in our opinion, quite clear that the master himself, whatever the owners may have done or omitted to do, is not relieved from responsibility. It was the clear intention of the Merchant Shipping Act of 1876 that the master as well as the owner should be held responsible for acts and omissions which might be dangerous to human life. Thus the fourth section declares that the master as well as the owner shall be responsible if he takes an unseaworthy ship to sea; so also the 22nd section, which relates to grain cargoes; so also the 24th section, which relates to deck loads of timber; and lastly, the 28th section, which deals with the load line. In all these cases it is declared that the master as well as the owner shall be liable for any breach of the statute.

But how stands this case? It seems that there were four ventilating bollards. Did the master see that they were in proper working order? In three of them the caps were fixed so that they could not be moved. The key also, we are told, was lost; and all four of them remained closed from the time of leaving port until the vessel foundered. Again, when the ventilating cowl, which was over the lazarette, was unshipped on the evening of the 22nd, the master took no steps to replace it. He said that it was bent, but the engineer told us that being of copper he would have had no difficulty in straightening and reshipping it had he been asked to do so. It appears to us that either the master was grossly negligent, or that he had no idea of the importance of keeping the hold and those parts of the vessel into which gas might find its way, properly ventilated; otherwise he would most certainly have replaced that ventilating cowl after it had been unshipped. I do not mean that such a cowl was all that could have been desired, but it would have been better than nothing, and there can we think be little doubt that had that cowl been replaced the lazarette would have been kept free from gas, and no explosion would have occurred.

To bring the knowledge of the dangerous character of this gas, and of the necessity for taking proper precautions home to the master, it was attempted to be shown that he had been served with a paper entitled "Explosions of Coal Gas on Board Ship. Official Caution," at the same time that the official log-book was given to him; but the evidence on this point entirely broke down. The notice in question bears date the 23rd of October last, and we are told that copies thereof were received at this port on the 15th November, with directions that it should be given to the masters of all vessels leaving this port coal laden; and as the "Richmond" did not leave until the 19th, a copy of this paper should have been given to this master. But although we have had before us three gentlemen from the Mercantile Marine Office in Cardiff, not one of them was able to say whether the master had had a copy of the paper given him. One of them, indeed, told us that he thought that a copy must have been given either to the captain or to his representative, or to his agent, or to some one or other; which can hardly be said to be conclusive evidence that the captain had had a copy given to him, in the face of the positive statement of the master that he had not seen it before he left. Two of the gentlemen, Mr. Miller and Mr. Baker, told us that on the return of the master to this port, one of them I think it was Mr. Baker, in order, as he said, to make assurance doubly sure, had held up a copy of this notice, and asked the master if he had ever seen it before, and that the master had said in an offhand way that he knew all about it. It turned out, however, that the master had arrived in Cardiff on Friday the 29th; and that on Saturday the 30th he had been with the collector of customs making his deposition from about

1 to 4 p.m. He told us also that it was only on the Monday morning that he saw for the first time a copy of this "Official Caution," and that it was not until after that that he had the interview referred to with Messrs. Miller and Baker. It is therefore quite possible that, when a copy of this paper was held up to him, he may have said that he knew all about it; but that would be no proof that he had been furnished with a copy of it before he left. Had this been brought clearly home to him, the sentence which we are about to pronounce would not have been so lenient an one.

I must not, however, leave this "Official Caution" without calling attention to what I conceive to be a very serious defect in it, and one which, in my opinion, should at once be remedied. In almost all the inquiries that have come before me, I have had occasion to remark upon the extraordinary confusion of ideas that seems to prevail in the minds of masters and others between "explosions" and "spontaneous combustion;" a confusion to which attention is especially directed in the Report of the Commissioners on "Spontaneous Combustion of Coal in Ships." The Commissioners say that "it cannot be too clearly understood that they originate from entirely distinct causes inherent in the coal;" and they urge very strongly the importance of maintaining a clear distinction between them. So distinct in fact are they that they can hardly co-exist. Moreover, explosions generally occur soon after the vessel has left port, and when the gases are more freely given off, and are allowed to accumulate on the surface. Spontaneous combustion is a slow process, originating in the body of the coal, and due to the presence in the coal of iron pyrites, and other substances.

Whilst then it is a matter of the utmost importance that explosions and spontaneous combustion should be kept quite distinct, and that this distinction should be strongly impressed on the minds of all who have to do with these coals, I fear that in drawing up this "Official Caution" or notice that distinction has not been clearly borne in mind. The notice is headed "Explosions of Coal Gas on Board Ship," and it might therefore be supposed that the recommendations which it contains would apply to cases of "explosion;" but this is not so, for after quoting some of the judgments pronounced by this Court in cases of explosion, it concludes with some recommendations, seven in number, all of which, with the exception of one, relate not to explosion of gas at all, but to spontaneous combustion. I observe, too, that it calls them the conclusions of the "Royal Commissioners appointed to inquire into explosions and spontaneous combustion on board coal-laden ships," whereas they were the commissioners appointed to inquire simply into spontaneous combustion of coal in ships, and not into explosions on board ship. It is true that the commissioners in one part of their report refer to explosions, but only incidentally, and they are most urgent in recommending that the two causes of casualty, namely, explosion and spontaneous combustion, should be kept perfectly distinct, which it appears to me that this official notice does not do. A notice relating to "explosions of coal gas on board ship," which contains seven recommendations, six of which relate to spontaneous combustion, and one only to explosions, is not likely to induce any very clear conception in the minds of merchant captains of the distinction between the two.

I am the more induced to mention this circumstance, for in the case before us there were two witnesses produced by the Board of Trade, who came prepared to say that this was a case of spontaneous combustion, in other words that it was no one's fault, and that it had arisen from the state of the atmosphere, and from the fact that rain had fallen when the cargo was being shipped, circumstances which had absolutely nothing whatever to do with the explosion in this case.

There is also another point in which, in my opinion, this notice is defective, so far at least as relates to the shipment of coals from Cardiff and other ports in South Wales, namely, that it does not call attention to the fact that the gas given off by the South Wales steam coal is inodorous, owing to the very small quantity of sulphur which they contain. I consider this to be a matter of the most vital importance. In all the cases which have come before me the witnesses have invariably given as an excuse for their negligence that they had not perceived any smell of gas. I have frequently in preceding cases called special attention to this fact, and I deem it to be of the utmost importance that masters of vessels should know that the absence of a smell of gas is no proof whatever in the case of the South Wales steam coal that gas is not present and in dangerous quantities.

Another question upon which the opinion of the Court has been asked is, whether the coal was shipped too soon after being wrought? On this I need only say that it

seems to be the invariable practice to ship this coal very soon after it has been wrought, sometimes on the same day. And we see no reason why this should not be done, provided that proper precautions are taken to allow the gas to escape, or, in other words, that the holds, as well as those places into which the gas might be likely to find its way, are properly ventilated.

It now only remains for us to say what ought to be done as regards this gentleman's certificate. The Board of Trade have said that they do no press for his punishment, but, considering the number of these cases which are constantly occurring, the real or assumed ignorance of captains on the subject, the serious consequences likely to result from the neglect of proper precautions; seeing, too, that in the present case the master altogether neglected to use the means which were provided for ventilating the hold; that he failed to see that the ventilating bollards were in proper working order, and allowed them to remain closed from the time of leaving port; that he neglected to replace the ventilating cowl to the lazarette after it had been unshipped; and that he failed to raise the hatches to

give ventilation to the holds as soon as we think he might and ought to have done, although he knew that there were no other means of ventilation to the holds. Looking at all the circumstances, and considering that nothing will prevent a recurrence of these casualties, except a knowledge on the part of masters that they will be held responsible, and will be punished if they do not take the necessary precautions to prevent them, we feel that we have no option but to suspend this gentleman's certificate for six months from this day. We shall, however, recommend that during the period of that suspension he be allowed a first mate's certificate, as we have no wish that he should spend those six months in enforced idleness on shore.

(To Mr. Ravenhill.) You do not ask for costs?

Mr. Ravenhill.—No, sir.

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

We concur.

(Signed) R. ASHMORE POWELL, } Assessors.
 JOHN S. CASTLE, }