

(No. 7810.)

"RIVER DARE." (S.S.)

THE MERCHANT SHIPPING ACT, 1894.

REPORT OF THE COURT.

In the matter of a Formal Investigation held at the Law Courts, Cardiff, on the 12th, 13th, 14th, 16th, 17th, 18th, 19th and 25th days of June, 1924, before St. John Francis-Williams, Stipendiary Magistrate for the City of Cardiff, assisted by Captains P. W. Tait and O. Jones, Nautical Assessors, and Mr. A. T. Wall, O.B.E., A.R.C.Sc., M.I.N.A., F.C.M.S., Naval Architect, into the circumstances attending the abandonment and loss of the British s.s. "River Dare" on the 22nd March, 1924, in or near latitude 37° 19' N., longitude 9° 06' W. (near Cape St. Vincent), North Atlantic Ocean.

The Court having carefully inquired into the circumstances attending the above-mentioned shipping casualty, finds for the reasons stated in the Annex hereto, that the cause of the foundering of the vessel was the continual increase in the initial list to port which was due to the influx of water, and also to the inevitable shifting of the cargo as the list increased.

Dated this 25th day of June, 1924.

ST. JOHN FRANCIS-WILLIAMS, *Judge.*

We concur in the above Report,

P. W. TAIT,	}	<i>Assessors.</i>
O. JONES,		
A. T. WALL,		

ANNEX TO THE REPORT.

This Inquiry was held at the Law Courts, Cardiff, on the 12th, 13th, 14th, 16th, 17th, 18th, 19th and 25th days of June, 1924. Mr. L. H. A. Pratt (Messrs. Vachell and Company) appeared for the Board of Trade and Mr. Gilbert Robertson for the master and chief officer.

The "River Dare" (formerly named "Ashpark") was a steel single screw steamship, built in 1919 by the Grangemouth Dockyard Company, Limited, of Glasgow, to the order of the Dunelm Shipping Company, Limited, of Glasgow. Her official number was 142273, and she was then registered at the port of Greenock. On the 29th March, 1920, she was transferred by Bill of Sale to Messrs. D. R. Llewellyn, Merrett and Price, Limited, of Aberdare House, Cardiff Docks, Cardiff, and on 27th May, 1920, the name of "Ashpark" was changed to "River Dare," and her port of registry to Cardiff. The Managing Owner was Mr. Roger Wilfred Price, of Aberdare House, Cardiff Docks, and Mr. Nelson Symonds Merrett acted as Managing Owner on behalf of Mr. Price.

The vessel was classed 100 A1 in Lloyd's Register, and was built under their special survey. She completed her first No. 1 survey in November, 1923.

Her registered dimensions were as follows:—Length, 280 feet; breadth 41.9 feet; and depth of hold from tonnage deck to ceiling at midships, 18.9 feet. Her moulded dimensions were:—Length, 280 feet; breadth, 41 feet 8 inches, and depth, 20 feet 9½ inches.

She had a top gallant forecastle, bridge and poop, and was of the type commonly known as a three island ship. The forecastle space was not fitted with any accommodation and could be used for cargo, having portable boards for closing at the after end. The bridge space could be used for cargo or bunkers, being closed at the after end with portable boards. The crew were berthed in the poop space which was entered from the deck over.

She was a single deck vessel with steel bulwarks, 4 feet high. In the forward and after wells open wash ports, with two cross bars, were fitted in the bulwarks. She was fitted with two masts and one funnel amidships and was schooner rigged. She had six derricks and five steam winches.

(K1785) Wt111/P20 375 7/24 H & S F Gp 77

She had a boat deck abaft the funnel and above the bridge deck. On the same level as the boat deck, and just forward of the funnel, was an upper bridge carrying a chart house and a 15-foot dinghy. Above the upper bridge was the flying or navigation bridge.

Her gross tonnage was 1,968.02 tons, under deck tonnage 1,787.71 tons, and net registered tonnage 1,196.03 tons. Her summer freeboard was 3 feet 0½ inches, and summer draft 18 feet 1 inch. Her winter freeboard was 3 feet 3½ inches, and winter draft 17 feet 10 inches. Her gross deadweight on summer draft was 3,310 tons, and on winter draft 3,240 tons. Her immersion at load draft was 23.4 tons per inch.

The vessel had four water-tight bulkheads, *i.e.*, one abaft the stem (the fore peak bulkhead), one on the forward end of the boiler space, one at the after end of the engine room, and one forward from the stern post (the after peak bulkhead).

She had two holds, *i.e.*, one between the forward pair of bulkheads and the other between the after pair of bulkheads. She had four cargo hatches, *i.e.*, two forward and two aft, giving access to the forward and after holds respectively. The dimensions of the hatches were:—No. 1, 22 feet 6 inches, by 16 feet, and Nos. 2, 3 and 4, 24 feet by 16 feet each. The hatch coamings, which were three feet in height, were covered with wooden covers and tarpaulins, with the usual hatch battens and wedges.

There was a cowl ventilator at the forward end of the forward hold on the middle line, carried through the forecastle and standing at the extreme height of 9 feet above the forecastle deck. There was a 16-inch cowl ventilator at the after end of the forward well on the maindeck and standing at an extreme height of 7 feet above the deck on the starboard side of the vessel. At the forward end of the after hold there was a cowl ventilator on the starboard side about a quarter of the width of the vessel from the middle line and standing at an extreme height of 18 feet above the maindeck, the lower part being cased in through the bridge space. At the after end of the after hold there was a cowl ventilator passing through the poop and standing at an extreme height of 8 feet above the poop deck on the port side of the vessel.

The capacities of the cargo spaces were:—

	<i>Grain.</i>	<i>Bales.</i>
	<i>cu. ft.</i>	<i>cu. ft.</i>
Fore hold	78,100	71,900
After hold... ..	63,300	56,800
Bridge	11,174	10,134
Total capacity	152,574	138,834

The bunker capacities were:—

	<i>Tons.</i>
Starboard bunker	130
Port bunker	130
Shoot	30
Bunker capacity	290
Including bridge space shown in cargo capacities which contained	225
Total	515

The lower bunkers were practically divided on the middle line by the two sides of the donkey boiler recess, with the exception of one frame space (3 feet) of their length.

A cellular double bottom was fitted practically the full length of the vessel, but not in the fore and after peaks and for five frame spaces forward of the after peak bulkhead. This double bottom was divided into five tanks with capacities as follows:—

	<i>Tons.</i>
No. 1	130
No. 2	218
No. 3 (dry space)	—
No. 4	89
No. 5	182
Total	619

The No. 1 tank extended from the fore peak bulkhead to about the middle length of the forward hold.

The No. 2 tank extended from about the middle length of the forward hold to six frame spaces abaft the bulkhead at the after end of the forward hold.

No. 3 tank was a dry tank under the boilers.

No. 4 tank was under the engines and had a middle line division which was practically water-tight.

No. 5 tank extended from the thrust recess in the engine room nearly to the after end of the after hold.

The capacity of the fore peak tank was 45 tons and of the after peak 43 tons, making a total capacity for water ballast—with the double bottom tanks—of 707 tons, not including the dry tank No. 3.

The tank top was carried straight out to the side plating of the vessel. In consequence there were no side bilges, and drainage pockets were provided in the wings as described below.

The vessel was fitted in both holds with close ceiling laid fore and aft on wood grounds. Tank side brackets were fitted to secure the side frames to the tank top plating. The tank top manholes were of the underhung type, fastened by two parallel dogs.

The drainage in the forward hold was collected in bilge pockets—port and starboard—at the after end. The drainage water in the after hold was collected in bilge pockets—port and starboard—at the forward end, and into a hold well at the after end of the vessel. These bilge pockets were about 1 ft. 9 inches square and about 18 inches deep, and were covered with wood covers secured by four battens. The hold well aft extended for two frame spaces. There was a tunnel well for three frame spaces at the after end of the tunnel.

The sounding arrangements were as follows:—

No. 1 tank was sounded from the main deck by a pipe on the middle line at the after end of the tank, abreast the foremast. No. 2 tank was sounded from the stoke hold; No. 4 from the engine room, and No. 5 from the tunnel. The fore peak tank was sounded from the main deck in the forecabin, and the after peak from the poop deck. The bilges in the forward hold were sounded from the bridge deck. The bilges at the forward end of the after hold could only be sounded by inspection from the tank top when the hold was empty. The after hold well was sounded from the tunnel, and the tunnel well by inspection from the tunnel recess.

The only compartments sounded from deck were the peaks, No. 1 tank and the forward hold bilges.

The vessel was built on the patent Millar system of framing. She had lightened plate floors on alternate frames, with open floor between, the latter having a bracket in the double bottom at the bilge only. There was one intercostal girder on each side of the vessel between the centre girder and the turn of the bilge. In addition, the bottom shell plating and the tank top plating in the double bottom were each fitted with five bulb angle stiffeners running continuously fore and aft through the floors on each side of the vessel. The frames on the plate floors were spaced 6 feet apart, abaft of the forward three fifths length, and forward of this were spaced 4 feet 6 inches apart throughout the double bottom. For seven consecutive spaces, each 3 feet long, forward of the after peak bulkhead plate floors were fitted. The frames in the peak were spaced at 23½ inches. The side frames were formed generally of bulb angles, 9 inches by 3½ inches by 0.60 inches, spaced 36 inches abaft the three-fifths length forward, and 27 inches forward of this. These frames were reinforced every fourth by a reverse angle bar, 5 inches by 3½ inches by 0.50 inches, carried to the maindeck. The intermediate frames were carried to the main deck and continued to the bridge deck by an angle frame 5 inches by 3 inches by 0.50 inches, overlapped on to the bulb angle frame. The reinforced frame fitted at every fourth frame was carried to the bridge deck. In the way of the reinforced frames deep transverse

deck beams were fitted to the main and bridge decks with large beam knees. The intermediate frames were bracketed to the stringer plates of the main and bridge decks. In addition to the deep beams on the decks, bulb angle stiffeners were fitted fore and aft; 11 to each of the main and bridge decks. The knees at the tops of the intermediate frames were not connected with any of the fore and after bulb angles.

The machinery was amidships with engine and boiler casings carried up through the bridge spaces, and the entrance to these spaces was from the bridge deck by doors in steel casings carried to the height of the boat deck.

The machinery consisted of one set of three cylinder triple expansion engines. The nominal horse power of the machinery was 230 and the indicated horse power 1,150, giving a speed to the vessel, according to the register, of 10 knots, but according to the evidence, of 9 to 9½ knots. The engine cylinders were 21 inches, 35 inches, and 57 inches diameter respectively, and the length of stroke 36 inches.

She had two cylindrical multi-tubular boilers of steel with a working pressure of 180 lbs. The engines and boilers were constructed by Messrs. Cooper and Greig, Limited, of Dundee, in 1919. She also had a vertical donkey boiler fitted in a recess in the coal bunker at the forward end of the stokehold, with a working pressure of 110 lbs.

She was fitted with a ballast donkey pump which had a full capacity of 80 tons per hour; and also a general service pump of 30 to 35 tons per hour capacity. Driven off the main engines were two engine bilge and feed pumps, but there is no evidence as to their capacity. She also had a hand Downton pump at the after end of the bridge space on the main deck, and a 5-inch hand pump to the upper fore peak.

The sea connections were as follows:—

Tank injection, 6½ inches; main injection, 6½ inches; auxiliary sea suction, 3 inches; and a sea suction to the general service pump (size not stated). She had also the usual water service valve and ash service sea cock.

The ballast donkey pump could be used for emptying or filling the ballast tanks and for pumping out the bilge and after hold wells. The bilge suction pipes were fitted with non-return valves. The engine bilge pumps could be connected up to the various bilge wells.

The boats and life saving apparatus were according to Board of Trade requirements. She had a lifeboat on each side of the vessel, of dimensions 22 feet by 7 feet by 2 feet 9 inches, each being of sufficient capacity to accommodate the whole crew. The davits were of the ordinary type and well housed. The forward davit guys were fastened to the bridge deck and the after davit guys to the bulwark rail in the after well.

According to the chief officer's log books covering a period from the 6th April, 1922, to the 29th January, 1923, and the 20th July, 1923, to the 29th December, 1923, respectively, four copper ore cargoes were carried in the vessel from Huelva to London, Amsterdam, Port Talbot and Norre Sundby respectively. The cargoes were of about the same weight and distribution as that carried on the voyage when the vessel foundered.

On the first voyage to London in May, 1922, no leakage in the vessel was recorded; the weather varied from light to strong breezes and at times there was a heavy swell.

On the second voyage to Amsterdam in August, 1922, no leakage was recorded; the weather was then light to moderate, with smooth sea.

On the third voyage to Port Talbot in October–November, 1922, no leakage was recorded. This was a rough voyage with heavy seas, and the vessel rolled and pitched and shipped heavy water fore and aft.

On the fourth voyage to Norre Sundby, Denmark, from the 23rd December, 1922, to the 2nd January,

1923, consists as follows:—

December
December
regu
December
wat
January
January
January
wat
January
cem
January
evic
pun
east
(

During the first trip On the trip although vessel and the le

According chief engineer whilst at causing the cause of the

In November survey and in the fo presumably

After the goes of Ghent, R three succ Swansea for Huelva weather p ballast. attributed to show her survey 1 tank and ing under seaworthy repairs we side of the and caulk the rivets being har the port and garb a quantiti landings

The "F" 1924, at told, and Thornhill master, 1 hour after

She wa copper p approxim Under N length wa height of pile of a middle le and rising consisted hatch wa the forwa the after pile consi

1923, considerable leakage was recorded, being as follows:—

- December 25th.—No. 5 tank leaking.
- December 26th.—No. 5 tank leaking; pumping regularly.
- December 27th to 31st.—No. 5 tank making much water.
- January 1st.—No. 5 tank making water.
- January 2nd.—No. 5 tank making much water.
- January 3rd and 4th.—No. 5 tank making much water at Norre Sundby.
- January 5th and 6th.—No. 5 tank examined and cement box fitted.
- January 6th.—No. 2 hold much water in, evidently coming through No. 2 tank top, pumped water from No. 2 hold bilges and eased No. 2 tank.

(Note.—This refers to fore hold.)

During this voyage the weather for 24 hours out of the first two days was a strong gale and high seas. On the third day No. 5 tank was found leaking although the weather had then moderated, but the vessel continued in a heavy swell with much rolling, and the leak continued as indicated above.

According to the evidence of Mr. Crocker, the late chief engineer of the "River Dare," and now assistant engineering superintendent, on another occasion, whilst at sea, water was found in the forward hold, causing the ceiling boards to wash about, but the cause of this leak was never discovered.

In November, 1923, the vessel completed her No. 1 survey and retained her class at Lloyd's, but the leak in the forward hold referred to by Mr. Crocker presumably remained undiscovered.

After this survey the vessel made voyages with cargoes of coal from the Bristol Channel to Calais, Ghent, Rouen, Zeebrugge and Huelva, and made three successive voyages in ballast from Zeebrugge to Swansea before leaving with her last cargo of coal for Huelva. During the early part of 1924 the bad weather pounded her bottom considerably when in ballast. There was leaking in No. 1 tank which was attributed to this pounding. There is no evidence to show that the vessel had touched bottom since her survey in November, 1923. This leakage in No. 1 tank and the damage was made good at a dry docking under Lloyd's survey at Port Talbot, and a seaworthy certificate was given by Lloyd's. All the repairs were in No. 1 tank and consisted on the port side of the renewal of 28 rivets and the hardening up and caulking of butts and landings in the way of the rivets; and, on the starboard side, of some rivets being hardened up and caulked. In addition, on the port and starboard sides in the way of the keel and garboard strakes, 58 loose rivets were renewed, a quantity of other rivets were hardened up and landings and butts caulked.

The "River Dare" left Huelva on the 21st March, 1924, at 10.20 p.m., with a crew of 24 hands all told, and was under the command of Mr. Herbert Thornhill, who holds a certificate of competency as master, No. 002609. The pilot left the vessel one hour after leaving Huelva.

She was loaded with a cargo of about 3,040 tons of copper pyrites. The stowage was in four piles, approximately under each of the four hatches. Under No. 1 hatch and somewhat abaft its middle length was a pile of about 375 tons, extending to a height of about 10 feet. Under No. 2 hatch was a pile of about 1,400 tons extending from about the middle length of the fore hold to the after bulkhead and rising nearly up to the deck. The forward piles consisted of crushed or powdered ore. Under No. 3 hatch was a pile of about 1,100 tons extending from the forward bulkhead to about the middle length of the after hold and rising nearly up to the deck. This pile consisted of rubble ore. Under No. 4 hatch was

a pile of about 166 tons extending from about the middle of the after hold to about the after end of the hold and rising to a height of about 6 feet. No shifting boards were fitted. The customary way of loading such a vessel at Huelva was adopted. The cargo was put on board by tubs lowered into the holds and tipped. The tubs were tipped at both sides of the hatches, and this was the only attempt made to trim the cargo. At the time of loading it was raining heavily, so that the cargo was wet, which particularly affected the powdered ore. She had carried a cargo of coal on the outward voyage to Huelva, and after this was discharged the holds were swept and the bilge wells cleaned. In addition to her cargo she had about 170 tons of bunkers which were stowed in the thwart ship bunkers. There was no apparent leakage in the ship on leaving Huelva. According to the evidence the stability of the vessel was large, on account of the ratio of her breadth to depth, and this was made larger by the distribution of such a cargo.

Her draft on leaving was 17 feet 10 inches forward and 18 feet 8 inches aft in fresh water. The allowance for fresh water was $4\frac{1}{2}$ inches, thus making a mean draft in salt water of 17 feet $10\frac{1}{2}$ inches with a freeboard of 3 feet 4 inches. The winter freeboard was 3 feet $3\frac{1}{2}$ inches, so that the vessel was loaded $\frac{1}{2}$ an inch under draft.

After the pilot left, the vessel proceeded at full speed on her voyage. The weather was fine, with the wind light from S.S.W., and the sea smooth.

According to the evidence the tanks and bilges were sounded at 7.45 a.m. on the 22nd March by the donkeyman, and at 9 a.m. by the chief officer. At about 10 a.m. the chief engineer sounded the tanks from the engine room and stokehold and the vessel was then pumped dry. No arrangements were made for recording the soundings of wells or tanks. At about 12.30 p.m. Cape Sagres was passed, $1\frac{1}{2}$ miles distant; and, at about 1.20 p.m., then off Cape St. Vincent, the vessel's course was altered to North. After passing Cape Sagres on a North-Westerly course the vessel started to roll slightly, there being then a moderate S.W. wind and swell.

At about 3.20 p.m., when about 19 miles north of Cape St. Vincent, the vessel took a list to port which was estimated to be about 10 degrees and did not recover. The second officer, Mr. Lloyd Briner, who holds a certificate of competency as chief officer; was in charge on the bridge. He states that the vessel took a sudden list to port. The third engineer (who had no certificate) was in charge in the engine room. He states that at about 3 to 3.10 p.m. he first noticed a little water flowing from the starboard side to the port side of the bilges, that it appeared as if the wind had heeled the vessel slightly; and that the list gradually increased and the vessel went over suddenly at about 3.20 to 3.30 p.m. The master states that he was in his berth when he felt the vessel make a sudden roll over to port, and the chief officer states that he was aroused by feeling the vessel heeling over to port. The second officer sent for the master, who came up with a sounding rod in his hand. The latter states he found water was coming through the open wash ports in the after part on the port side. The chief engineer was called and about five minutes later went on deck.

The master sounded the bilges forward and found 6 inches of water in the starboard well and 4 inches in the port well. These soundings indicated that the forward hold was practically dry. No order was given for all hands to be on deck, but they appeared on deck. After sounding the bilges the master met the 3rd engineer who said, "What's the matter?" and the master replied, "What's the matter?" Immediately after, the latter ordered the 3rd engineer to pump up the starboard side of No. 4 engine room tank. This order was carried out and completed about 3.35 p.m. In the meantime the list continued to increase and the master ordered the chief officer to

take off a hatch cover of the starboard forward corner of No. 1 hatch to see, he states, if the cause of the list could be found. When the hatch cover was taken off, the chief officer saw a large quantity of water in the fore hold and the flooring boards washing about. He then went aft to the master who came forward and called the chief engineer, whom he saw on the bridge deck, to come and look down the hold. According to the master's evidence there was a considerable quantity of water in the forehold and the flooring boards were washing about. He estimated the water to be some feet up on the port side and a few inches over the manhole door on the starboard side. None of the cargo which he saw appeared to him to have shifted. The water was washing a little of the cargo to the port side. He states that the cone had not altogether disappeared, and that he could not hear any rush of water. The chief officer states that the water was well up on the port side; that the lower part of the cargo was covered with water and the cargo appeared to be about the same as when stowed—with not much of a pyramid. The boatswain who saw the cargo loaded states that the cone, or pyramid, had sunk down a "terrible lot" on the port side. The chief engineer states that the water appeared to be about 10 to 12 feet on the port side, and estimated the list to be about 30 to 32 degrees. After seeing the water in the forehold the master ordered the chief engineer to put the pumps on the bilge wells and also ordered the chief officer to open the starboard manhole door in the tank top with a view to relieving the water in the forehold by using the No. 1 tank suction. The master then returned to the bridge with the object of stopping the engines and getting the boats ready.

With the exception of taking off No. 1 hatch and looking into the hold, the master took no step to ascertain from where the water was coming. He had no discussion or consultation about the matter with the chief officer, chief engineer, or the other officers. The chief engineer states that no one expressed astonishment at finding the water in the forehold—that the master made a gesture and looked surprised. The second engineer states that in conversing with the third engineer about the heavy list there was no discussion or curiosity as to its cause.

The chief officer states that the master ordered him to take off the port, and not the starboard, manhole door. The boatswain and Thompson—an A.B.—stated that the chief officer asked for a volunteer to go below to carry out this order, and Thompson thereupon volunteered. The chief officer, however, states that he told Thompson to go below for this purpose, that he did not go himself as he had to fetch a hammer, and that he might be wanted to heave a line, or carry out other orders for the master.

According to the evidence of Thompson, he was provided with a heavy maul and a life line. He went down the ladder, and then went about 5 or 6 feet in the direction of the port manhole door, which was about 10 to 12 feet from the foot of the ladder. He could not go further owing to the quantity of water and the flooring boards washing about. He estimated that the port manhole was covered with water to a depth of about 6 feet. The water in the hold was in a line with the centre of the hold and about half way up on the port side. It was not washing over the starboard manhole door, which, he states, he could have removed without any difficulty. He found that the cargo had shifted. He shouted that the port manhole door could not be removed, and on hearing some reply he left the hold. The chief officer states that if he had received the order to open the starboard manhole door it would have been carried out without difficulty.

After Thompson came up the hatch was battened down, and the chief officer went aft to assist in launching the lifeboats. The latter states that the list was then about 20 to 30 degrees. No one made any report to the master as to the result of the attempt

to remove the manhole door or as to the condition of the water in the forehold. And neither did the master make any inquiry as to the result of such attempt, or the condition of the forehold. No attempt was made to discover any leak in the holds above the tank top, and no other hatches were removed for examination.

Shortly after, the master went on the bridge, *i.e.*, at about 3.30 p.m., ordered the engines to be reduced to slow, and the boats to be cleared away. The list had increased to about 30 degrees, and he states that he then considered the vessel was doomed.

After receiving the order from the master to put on the bilge pumps the chief engineer went to the engine room and shouted the order to the second engineer. Immediately after the starboard No. 4 tank was filled the ballast donkey pump was put on to the forward bilges. The chief engineer states he saw the discharge from this pump but there is no evidence that it was seen by any other witness, although the second and third engineers state that the pump was working properly.

According to the second engineer the bilge pumps were put on after the engines had been slowed down.

The chief engineer states that he went to the engine room on several occasions, but according to the other engineers he was in the engine room on one occasion only, and then when he went to the middle grating and looked at the water in the boilers. He made no suggestion nor did he give any order with a view to ascertaining the cause of the list, or of the water in the forehold. The firemen were not in the stokehold after about 3.20 p.m. and no steps were taken to control them. The chief engineer made no enquiries respecting them and took no step to secure that they remained at their posts until ordered to leave. The chief engineer appears to have spent his time standing at or near the engine room door. He states he was waiting for orders before doing anything. The master, however, states that he expected the engineers to put the pumps on No. 1 tanks without orders.

About 3.30 p.m. the second officer was ordered by the master to clear away the lifeboats. Owing to the after davit guy of the port boat being fastened to the top of the bulwark rail in the after well, which was then under water, some difficulty was experienced in loosening the guy and swinging out the port boat. It was not found possible to swing out the starboard boat owing to the list.

Between 3.30 and 3.45 p.m. the dynamo was started by order of the master and a S.O.S. signal sent out. The distress signal N.C. was hoisted, indicating, "in distress, want immediate assistance." The whistle was blown continuously.

When the engines were put slow the master ordered the starboard helm to bring the vessel head to sea with a view to keeping down the rolling. About 4 p.m. the engines were stopped by the master's orders, the second and third engineers came up out of the engine room, and all hands prepared to leave the vessel. The list had then increased to about 35 to 40 degrees. The chief officer again opened No. 1 hatch to see, he states, if the water had increased and if the pumps were getting it out. He further states that if he had found she was not making water he would have told the master. He found, however, that the water had increased considerably and was about half way up on the port side.

The "River Dare" had passed the Danish s.s. "Lexa Maersk" between noon and 1 p.m. on the 22nd March, and this vessel in response to the distress signals came close alongside at about 4 p.m. after having launched one of her lifeboats. At about 4.10 p.m. the master of the "River Dare" decided to abandon his vessel. Seven of the crew, including three natives, were taken in the lifeboat of the s.s. "Lexa Maersk," and the remainder left in the

port lifeboat and crew rendered t

At about by the m "River Dare" but it was The bridge entering th on the brid She turned the water, about 100 latitude 3° was about 19 miles n

The Cou due to th reasons:—

(a) That be require

(b) That not rolled

(c) That would not suddenly.

The Cou sudden list There is a ballast tar In a vessel water is l consequen vessel in th had no ri surface of bottom of of the sta culated in residue wa

The fore depend on maximum this vessel the stern, free surfa stability c great as it keel. The where the small spac residue w would pro of the ves list over su The histo occasions If there w voyage in the sudden

With re Court is of the straini forehold.

Accordin of the bu pyrites wa been consu this vessel strengthen wet powde the botto about 1,40 bulkhead to the pre about thre a loading unduly st fitted with

port lifeboat. Credit is due to the master, officers, and crew of the "Lexa Maersk" for the timely aid rendered to the "River Dare."

At about 4.20 to 4.30 p.m. an attempt was made by the master and chief officer to return to the "River Dare" in the lifeboat of the "Lexa Maersk," but it was considered to be too dangerous to approach. The bridge rails were under water and water was entering the vessel through the port stokehold door on the bridge deck. The vessel foundered at 5.30 p.m. She turned right over on her side with her funnel in the water, and finally sank slightly by the stern in about 100 fathoms of water. Her position was latitude 37° 19' N. and longitude 9° 06' W. She was about 11 miles from the nearest land and about 19 miles north magnetic of Cape St. Vincent.

The Court considers that the sudden list was not due to the shifting of the cargo for the following reasons:—

- (a) That a great amount of shifting of cargo would be required to give the vessel a list of 10 degrees.
- (b) That the evidence showed that the vessel had not rolled sufficiently to cause the cargo to shift.
- (c) That the shifting of the cargo due to rolling would not of itself cause the list to take place suddenly.

The Court considers that the probable cause of the sudden list was the presence of free water in the vessel. There is always residue water in the double bottom ballast tanks which the pump suction cannot draw. In a vessel with a rise of floor the free surface of this water is limited by the rise of the bottom, and in consequence the reduction in the stability of the vessel in the upright is very small. The "River Dare" had no rise of floor, and in consequence the free surface of the water would extend right across the bottom of the vessel; thus causing a large reduction of the stability of the vessel in the upright, as calculated in the usual way without reference to this residue water.

The fore and aft extent of this residue water would depend on the trim of the vessel. It would have its maximum extent with the vessel on a level keel. When this vessel left Huelva she had a trim of 10 inches by the stern, which was small, so that the effect of the free surface of the residue water in reducing the stability of the vessel in the upright was nearly as great as it would have been with the vessel on a level keel. The water leaking into the forward hold, where there was much open space on account of the small space occupied by the cargo, coupled with this residue water in the double bottom ballast tanks, would probably be sufficient to destroy the stability of the vessel in the upright, and thus cause her to list over suddenly and to an angle of about 10 degrees. The history of this vessel shows that on former occasions Nos. 1, 2 and 5 ballast tanks have leaked. If there was a renewal of this kind of leakage on the voyage in question it would necessarily accelerate the sudden list.

With regard to the leakage into the forehold the Court is of opinion that this was probably caused by the straining of the bulkhead at the after end of the forehold.

According to the evidence of the chief draughtsman of the builders of the vessel the cargo of copper pyrites was a "cruel one" for her, and that if he had been consulted as to the suitability of this cargo for this vessel he would have recommended additional strengthening. At the after end of the forehold the wet powdered ore was piled up practically level with the bottom of the hatch coamings. This pile was about 1,400 tons. The consequent pressure on the bulkhead would have been approximately equivalent to the pressure brought about by a head of water of about three times the depth of the bulkhead. Such a loading was therefore much too severe and would unduly strain the bulkhead. This bulkhead was fitted with two horizontal stiffening brackets attached

to the shell plating, on each side of the vessel and on each side of the bulkhead. The brackets extended on the shell plating for one frame space only. The brackets on the forward side of the bulkhead and/or the boundary angle of the bulkhead would in all probability have started to leak by this abnormal pressure and thus cause the inrush of water into the forehold.

It is noted that there is no record in the Logs which were produced to the Court of the vessel having previously carried powdered ore except in bags. The carriage of the ore in bags would not cause such a similar strain on the bulkhead.

The Court desires to make the following recommendations:—

(1) That cargoes of copper pyrites should be stowed only in vessels specially constructed for the purpose of carrying dead weight cargoes of such a concentrated character.

(2) That all vessels should be constructed with a rise of floor in order to diminish the risk of reduction in the stability of the vessel in the upright by limiting the free surface of residue water in the double bottom ballast tanks.

At the conclusion of the evidence, Mr. Pratt, on behalf of the Board of Trade, submitted there was a case of default against the master and chief officer.

He also submitted the following questions upon which he desired the opinion of the Court:—

1. What was the cost of the vessel to her Owners? What was her value when she left Huelva on her last voyage?

What insurances were effected upon and in connection with the vessel?

2. When the vessel left Huelva on the 21st March last—

(a) Was she in good and seaworthy condition as regards hull and equipment and fit to carry safely a full deadweight cargo of copper pyrites?

(b) Was the cargo properly stowed and secured from shifting and were the weights so distributed as to make the vessel easy in a seaway, and to avoid as much as possible undue strains on any part of the structure?

(c) Had the vessel the freeboard required for a winter voyage?

3. What was the cause of the vessel suddenly taking a list to port at or about 3.20 p.m. of the 22nd March last?

What amount of water was in the forehold at this time?

What was the cause of the vessel making water in the forehold?

Were prompt and proper measures taken to ascertain and locate the same?

4. Were prompt and proper measures taken to get the vessel upright, pump out the water in the forehold, and for the safety of the ship?

5. Was the water pumped out of the forehold and, if not, why not?

6. At what time did the master and crew leave the ship?

What was her condition at that time?

Was the vessel prematurely abandoned?

7. Was there any panic amongst the Indian native members of the crew?

Did the master threaten them or any of them with a revolver in order to maintain discipline?

8. What was the cause of the foundering of the vessel at or about 5.30 p.m. of the 22nd March last?

9. Was the vessel navigated with proper and seamanlike care?

10. Was the loss of the s.s. "River Dare" caused by the wrongful act or default of the master and chief officer or either of them?

The Court then considered the questions and answered as follows:—

1 The cost of the "River Dare" to her Owners was \$192,000. About £6,000 was spent on repairs after her purchase.

According to the evidence of the acting managing owner of the vessel, her value when she left Huelva on her last voyage was £40,000, but in the absence of other evidence upon this point the Court is unable to accept that amount as being her value.

The following insurances were effected in and upon the vessel:—

Hull and Machinery	...	...	£43,000
Freight	...	...	6,450
Disbursements	...	...	4,300
Premiums reducing	...	...	2,510
			£56,260

2. (a) There is no evidence to show that when the vessel left Huelva on the 21st March last with a cargo of about 3,040 tons of copper pyrites she was not in good seaworthy condition as regards hull and equipment; but, having regard to her construction, which gave her only the ordinary standard of strength, and to the absence of 'tween decks or other means for distributing and raising the weight of the cargo, she was not fit to carry safely a full dead weight cargo of such a concentrated character.

(b) Having regard to the practice of loading copper pyrites at Huelva, and to the construction of the vessel, the Court considers in the circumstances that the cargo was properly stowed but not secured from shifting, and that the weights were so distributed as to make the vessel as easy as possible in a seaway and to avoid as much as possible undue strains on any part of the structure. Too great a weight of cargo was inevitably stowed against No. 2 bulkhead. No blame, however, is to be imputed to the master for such loading as it appears to have been done as effectively as was possible in a vessel such as the "River Dare."

(c) The vessel had the freeboard required for a winter voyage.

3. Within 17 hours after leaving Huelva, *i.e.*, about 3.20 p.m. on the 22nd March, while proceeding at full speed in fine weather with a moderate wind, a slight swell and little rolling, the vessel having experienced neither bad weather, nor shock nor collision with any object, nor been aground, took a sudden list to port of about 10 degrees. About 10 minutes later the list had increased to about 30 degrees, and water was found in the forehold. At about 4.10 p.m. it had increased to about 35 to 40 degrees, when the vessel was abandoned; and at about 5.30 p.m. she foundered on her beam ends on her port side slightly by the stern.

There is no positive evidence as to the cause of the vessel suddenly taking a list to port at about 3.20 p.m., inasmuch as no adequate steps were taken by the master or his officers to ascertain the cause thereof. They could not assign any cause, nor could any of the witnesses give any opinion which afforded any guidance to the Court.

From an inspection of the forehold at about 3.30 p.m. it did not appear that the cargo had shifted materially, but loose water was seen and appeared to extend from the centre line to about 10 feet up the port side. The Court calculates that this loose water amounted approximately to 175 tons. But such quantity of loose water would not by itself account for the sudden list of 10 degrees—which increased in about 10 minutes to 30 degrees. Inasmuch as the cargo did not appear at 3.30 p.m. to have shifted materially there must have been some other contributing cause or causes. After carefully considering the probable or possible theories which might be advanced in explanation, the Court is of opinion that the probable contributing cause was the presence of loose water over a large area in the ballast tanks. This opinion is based upon the following facts or circumstances:—

(1) That there was residue water in the double bottom tanks which the pumps would not draw;

(2) The absence of any rise of floor of this vessel would allow the residue water to be spread across the bottom;

(3) That water in the fore hold, when added to the residue water in the ballast tanks would render the vessel so unstable in the upright that she might at any moment take a sudden list either to port or starboard.

Hence the Court is of opinion that the probable cause of the vessel suddenly taking a list was the water in the forehold and the presence of residue water in the ballast tanks.

Having regard to the character, distribution, and weight of the cargo, and to the construction of the vessel, the Court is of opinion that the probable cause of the vessel making water in the forehold was the failure of the bulkhead in the after end of the hold to withstand the excessive strain of the 1,400 tons of powdered ore cargo stowed at the after end of the hold. Such cargo was piled against the bulkhead, the top of the pile being about level with the hatch coamings. The consequent pressure on the bulkhead might have caused the bulkhead brackets to the shell plating and/or the boundary angle of the bulkhead to be started and thus cause the leakage in the forehold.

The master having directed the chief officer to open No. 1 hatch and having seen the water in the forehold, gave orders that an attempt should be made to open the forward starboard manhole in the tank top with a view to relieving the water in the forehold by using the No. 1 tank suction. The master went to the bridge and the chief officer instructed Thompson—an A.B.—to go down into the hold for the purpose of opening the tank manhole door. Thompson went into the fore hold but failed to open any manhole door.

After Thompson had left the forehold, No. 1 hatch was again battened down. The master made no enquiries and the mate made no report as to the success or failure of Thompson's visit to the forehold.

In the meantime the chief engineer was standing near the engine room door awaiting orders.

The list continued to increase apparently without exciting any desire on anybody's part to ascertain the cause of it. It is uncertain that any attempt to stop the leak, when found, would have resulted in saving the vessel, but this fact does not diminish the Court's astonishment at the stolid indifference which appears to have been displayed by the master, the chief officer and the chief engineer as to the source of the danger with which they found themselves confronted.

Hence the Court is of opinion that prompt and proper measures were not taken to ascertain and locate the cause of the list or the water in the forehold.

4. Prompt and proper measures were taken to get the vessel upright and to pump out the water in the forehold, but having regard to the failure to take proper measures to ascertain the cause of the list and of the vessel making water in the forehold, the Court is of opinion that prompt and proper measures were not taken for the safety of the vessel.

5. Efforts were made to pump out the forehold by the ballast donkey pump, but, owing to the quantity of water, and the increasing list of the vessel, the pump does not appear to have had any appreciable effect.

6. The master and crew left the vessel at about 4.10 p.m. She then had a list to port of about 35 to 40 degrees, the top of the lower bridge rails was level with the water, and the sea was over the hatches on the port side. The vessel was not prematurely abandoned.

7. There was no evidence of any panic amongst the Indian native members of the crew and there was no evidence that the master at any time threatened them with a revolver in order to maintain discipline.

8. The
the contin
was due
inevitable

9. The
seamanlike

10. Whi
master an
the leak, y
leak had
have been
Court con
chief offic
the findin
caused by
them. Bu

To be

8. The cause of the foundering of the vessel was the continual increase in the initial list to port which was due to the influx of water, and also to the inevitable shifting of the cargo as the list increased.

9. The vessel was navigated with proper and seamanlike care, except as hereinafter mentioned.

10. Whilst it was the imperative duty of the master and officers to endeavour promptly to locate the leak, yet inasmuch as it is not shown that, if the leak had been located, any measures which might have been taken could have saved the vessel, the Court considers that the conduct of the master and chief officer was not sufficiently culpable to justify the finding that the loss of the "River Dare" was caused by wrongful acts or defaults of either of them. But the Court cannot refrain from expressing

its amazement that no attempt was made either by the master, or by the chief officer or by the chief engineer, either singly or in consultation with each other, to ascertain how the water got into the forehold or whether there was any loose water in any other part of the vessel. Even after every allowance has been made for the gravity of the position in which they were placed this astonishing lack of curiosity as to the source of their danger is wholly inexplicable.

ST. JOHN FRANCIS-WILLIAMS, *Judge.*

We concur,

P. W. TAIT	}	<i>Assessors.</i>
O. JONES		
A. T. WALL		

(Issued by the Board of Trade in London
on Friday, the 25th day of July, 1924.)

LONDON :

PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE.

To be purchased directly from H.M. STATIONERY OFFICE at the following addresses:
Imperial House, Kingsway, London, W.C. 2 ; 28, Abingdon Street, London, S.W. 1 ;
York Street, Manchester ; 1, St. Andrew's Crescent, Cardiff ;
or 120, George Street, Edinburgh ;
or through any Bookseller.

1924.

Price 9d. Net.

Printed under the authority of HIS MAJESTY'S STATIONERY OFFICE
By Henderson & Spalding Ltd., Camberwell, London, S.E. 15.