THE LEPANTO. NEDERLANDSCH AMERICAANSCHE STOOMVART MAATSCHAPPY *v.* THE LEPANTO AND ANOTHER.

District Court, S. D. New York. August 23, 1884.

1. COLLISION—FOG SIGNALS—ERRONEOUS LOCATION OF WHISTLE NOT A FAULT.

An error of five points in locating a vessel's position by the sound of her whistle in a fog is not necessarily a fault, under the proved aberrations in the course of sound.

2. SAME—DUTY OF VESSEL.

If the sound comes apparently from a definite direction, a steamer is justified in steering away from it; but if it seem *near,* she is also bound, at her peril, to stop and reverse at once. If she does not do so, she must, *prima facie,* answer according to the event.

3. SAME—MODERATE SPEED.

Where a steamer is properly officered and manned, and her officers and lookout are attentive and alert, and locate a whistle according to the best judgment attainable at the time, if her previous speed was moderate, and on first hearing the whistle in a definite direction, apparently near, she at once steers away from its apparent direction, and immediately stops and reverses her engines at full speed, she does all that is possible on her part to avoid collision, and is not liable; and if both vessels do the same, and a collision ensue on account of an erroneous location of the whistle by one or the other, it must be set down to inevitable accident, and the loss remains where it fell; but if either fail in these duties, and a collision ensue that would have been avoided by observing them, the fault is hers that neglected these obligations.

4. SAME—CASE STATED.

The steamer E. was going E. ½S., in a dense fog, near George's bank, under reduced speed of seven to seven and one-half knots; the steamer L. was going west under half speed, four and one-half knots; they heard each other's whistles about the same time, and about four minutes before collision; the E. located the L.'s whistle three to four points on her starboard bow, *i. e.,* about S. E., and at once starboarded, to go to the northward, and (probably)

slowed, but did not reverse; the L. located the E.'s whistle about two points on her port bow, *i. e.,* about W. S. W., and at once ported, to go to the northward, also, and at the same time, reversed full speed; when the E. had got heading N. E., and the L., W. N. W., the L. struck the E. amidships, and the E. soon sunk. *Held,* on conflicting evidence, that both were in error as to the bearing of each other's whistles; that they were about 3,100 feet apart when the whistles were first heard; that the L. was in fact about one and one-half points on the E.'s port bow, instead of three to four points on her starboard bow, and that this error was material; that the E. was about two-thirds of a point, instead of two points, on the L.'s port bow, but that this error was immaterial as respects the L.'s navigation. *Held,* that neither was in fault for mere error in locating the other, or for steering to the northward; but that the E. was in fault, both for excessive speed (seven and one-half knots) when the whistle was first heard, and also for not reversing at once, the L.'s whistle seeming near. *Held, also,* that the L. was nearly stopped at the collision, and would 652 have been fully stopped before collision, and within her share of the distance that separated the two steamers when the whistles were first heard, had the E. observed her duty; and that the L., therefore, was not to blame; that her previous speed (four and one-half knots) was "moderate;" that she violated no rule or custom of navigation; and that the whole fault of the collision was on the part of the E. in not reversing, and in her immoderate speed.

5. SAME—REDUCTION OF PRESSURE.

Some reduction of steam pressure being usual and apparently necessary, for mechanical reasons, when going at reduced speed, *held,* in the absence of proof, that the reduction of steam pressure on the L. from 75 pounds to 60 pounds was not excessive; that no fault of the L. in this respect was shown, since it appeared affirmatively that the L. had all necessary power in reserve to perform her duty by coming to a full stop within less than her share of the distance from the E. after the whistles were heard.

6. SAME—ARTICLE 19, NEW RULES—NOTICE.

Article 19 of the new regulations, (1880,) providing for notice by one or two short blasts of the whistle to indicate a port or a starboard helm, is expressly made optional. Failure to indicate or to reply at sea being no breach of the rule, or of any proved custom, *held,* not a fault.

In Admiralty.

The libel in this case was filed by the owners of the Dutch steamship Edam, against the British steam-ship Lepanto, *in rem,* and against her master, *in personam,* to recover $450,000, the alleged value of the Edam and her cargo, which were sunk by a collision with the Lepanto during a dense fog off George's bank, at about 10 P. M. on the night of September 21, 1882.

The Edam was an iron steam-ship, and one of the libelants' line of packets engaged in the transportation of freight and passengers between New York and Holland. She was of 2,276 tons register, 320 feet long, 39 feet beam, and 32 feet deep. She left New York, bound for Botterdam, in the forenoon of September 20th, with a full cargo of merchandise, 54 men, officers and crew, and 21 passengers. The Lepanto was an iron steamer carrying freight only. She was of 1,800 tons register, 305 feet long, 36 feet wide, and 26 feet deep. She sailed from Hull bound for New York, on September 5th, with a medium cargo, and 34 men, officers, and crew. At the time of the collision she was drawing about 20 feet of water, and had about 9 feet free-board.

On the evening of the 21st the wind was light from the S. W., and the sea smooth, with a moderate roll. Each steamer had taken meridian observations at the previous noon, and corrected the ship's clock for local time accordingly. Their difference in longitude was then about 14 minutes of time, which nearly agrees with the difference of their clocks as to the time of the collision. Until the first whistle of the Lepanto was heard, a few minutes preceding the collision, the Edam had been sailing E. ½ S. by compass; the Lepanto, due W. by compass. The log of the Edam, which was put in evidence after the principal argument of the cause, was made up on the 24th, on the arrival of the Lepanto in New York, and gives the following narrative:

"From 8 o'clock, light breeze from the west, mostly still, with intermitting fog showers; clear over head; sea, calm. Steered E. ½S., (by compass.) At 9 P. M., thick with fog; steamed with moderated speed, and blew the steam-whistle as is required. At 9:50 *answered* another steam-whistle bearing about 3 to 4 points on starboard bow; put the helm immediately hard a-starboard, and blew two short blasts on the steam-whistle. Shortly thereafter we heard again a steam-whistle, almost abeam on starboard side. The outlook reported *then* a green light on starboard side. *Believing that all was clear, we steadied* the helm and were then heading N. E. by E. per compass. But immediately thereafter we saw a steam-ship bear right down on us. Put the helm immediately again hard a-starboard, and blew again two blasts on the steam-whistle. The vessel was, however, so near by that collision was unavoidable. We could do nothing better than to let the ship run on in the hope that she should pass astern of us. But she ran into us abreast of the engine-room. Ordered immediately the engine to stop; but this order remained unanswered, because nobody could get any more to the starting gear, by reason of the damage and the inpouring water. The vessel went into us through the starboard side deck-house up to the ventilator, got thereafter clear again, and ran a second time into us, abreast of the main rigging, went through the starboard side, demolished bulwark davit, and took part of the main rigging away. Hit us thereafter another time, abreast of the vestibule, whereby one of the boats with davits and bulwarks was demolished; ran thereafter astern of us. Our ship was heading then N. E., (by compass,) and made yet some headway. Right thereupon the engine stopped, and the ship began to sink fast. Noticed that the engine-room ran full of water. Had meanwhile closed the tunnel door. We put out, as soon as possible, boats Nos. 1, 2, and 4, awaked the passengers, and

let them go with the crew, as soon as possible, into the boats. By this time there was already water in the saloon. "* * * One of the boats of the steamship, which later proved to be the Lepanto, of the Hull line, came along-side, wherein five persons were placed yet. Went together to the Lepanto, where we, passengeis and crew, mustered as best we could, with the doleful result that the third engineer, Nicolas Laijendecker, and assistant engineer, Jan Van Geijt, were lost. * * *" Signed by J. H. TAAT (captain) and J. A. LAACKBOY, (first officer.)

The testimony showed that the first officer was on the bridge in actual charge of the navigation of the Edam. The third officer was also on the bridge, and the captain a part of the time on the bridge and a part of the time on the deck, with another lookout properly stationed, and other seamen also on deck. Their testimony in general sustains the narrative of the log, though with some important differences. The interval between the first whistle and the collision is estimated by the officers at 2½ to 3 minutes; the lookout estimates it at 6; but no time was taken by the clock. Only two whistles from the Lepanto were heard, estimated to be about two minutes apart. The first officer estimated the time during which the helm was steadied to be about half a minute; and the time from the second order to starboard to the collision about the same. In the libel and in the testimony it is stated, though not stated in the log, that when the first whistle was heard the engines were ordered to "slow." No other order to the engineer was given. The lookout testified that the green light was seen and reported by him after the second whistle was 654 heard, in accordance with the statement of the log. The officers testify that it was reported, and seen by them, as a momentary flash, some five or six seconds after the first whistle was heard, and just after the first order to starboard was given. The green light was not referred

to in the original libel, or first amended libel, but is mentioned only in the second amended libel.

The log of the Lepanto is as follows:

"Sept. 21, 1882, 8 P. M., steering west by pole compass. Calm, fine, clear weather; smooth water. 9 P. M., light S. W. airs; the weather became foggy; warned chief engineer that if fog continued should go slow, and to ease steam down at once; also began to blow steam-whistle at intervals of two minutes. 9:30, fog lifted a little. 10 P. M., thick fog; half speed the engines. 10:10 P. M., heard a whistle *close to our port bows;* stopped engines, helm hard a-port, and full speed astern. 10:12 P. M., heard a whistle and saw a masthead light very close, bearing W. S. W., and at same time made it to be a vessel crossing our bows from south to north. 10:15 P. M., came into collision with a steamer (our head at the time being W. N. W.) which never stopped crossing, but dragged right across our bows, at the same time swinging to the westward, her propeller going all the time. 10:17 P. M., after getting clear of the steamer stopped engines, sounded the compartments, soundings being F. 4, M. 5, aft 3, making no water. Immediately sent away a boat in charge of second officer to her assistance, that at 10:30; got out three other boats, sending away two more, with all our crew and officers, to render assistance, (making three boats in all.) 10:35 P. M., saw the steamer again on our pqrt side, abeam, close to; slow ahead engines, and headed our ship to N. E. and stopped. 11:30 P. M., the boats of the Edam (three in all) arrived along-side with the passengers and crew, who were at once embarked. 11:40 P. M., one of our own boats returned, bringing the chief officer of the Edam, a quartermaster, the steward, and two passengers. 11:45, all our boats returned. "* * * On examination of the forward compartment next the stem, discovered a large aperture, the stem twisted

over the starboard and broken, also bow-plates stove in. * * *"

This account is confirmed by some five or six of the Lepanto's witnesses. The master, Capt. Rogers, was on the bridge, in charge of the navigation, and the second officer, as lookout, was on the top of the pilot-house, with another lookout forward. The chief engineer, with an assistant, was on duty in the engine-room. The master handled the lanyard of the whistle, and took the times stated from a clock near by. The time of the collision, 10:15, however, was taken, as he testified, not at the moment of collision, but "from half a minute to a minute after the vessels had cleared." Only two whistles from the Edam were heard, both long blasts. All the Lepanto's witnesses testified that the Edam's first whistle bore about two points off their port bow; several of them say that the second whistle was about two minutes subsequent, and that the collision was about two minutes after the second whistle. The master and others testify that the Edam's mast-head light was not seen at the same instant that the second whistle was heard, as would be inferred from the log, but from a half minute to a minute later. The engineer and his assistant testified that the orders to stop, and to reverse, came together at 10:10. 655 and were immediately obeyed; that it took about one minute to get the engine started on the reverse; that the reverse movement works slow at first, gradually increasing for about a minute and a half, when the engine gets full speed astern; and that he estimated two minutes' full speed astern to be sufficient to stop all forward motion of the ship when going, as she had been, at the rate of 4½ knots. He further testified that at 9 P. M., under the captain's orders, the steam pressure was reduced from 75 pounds to 60, bringing down her previous full speed of 9 knots to 8 knots per hour; that at 10 P. M. she was put at half speed, making from 4 to 4½ knots per hour.

The Edam's full speed was from 10½ to 11 knots. At 9:30 her steam pressure was ordered to be eased, her revolutions were brought down from 58 to 37 per minute, and her speed reduced to 7½ knots, according to the chief engineer, or 7 knots, according to the master's estimate. Both sides testified that the fog was dense and wet low down towards the water, while the stars remained visible overhead; and that prior to 9:30 the fog alternated in rarer and denser drifts. Capt. Rogers testified that considerable echo accompanied the whistles.

Philip J. Joachimson and *F. A. Wilcox,* for libelants.

Foster & Thomson, for defendants.

BROWN, J. The basis of actions of this character is some fault in the vessel or person sued. Fault consists in the violation of some statutory rule of navigation, or in the failure to exercise due nautical skill or prudence. The burden of proof is upon the libelants. To entitle them to recover they must point out the fault complained of, and establish it by a fair preponderance of evidence. The faults urged against the Lepanto in this case are (1) immoderate speed; (2) that, being south of the line of the Edam's course, she unjustifiably ported her helm and crossed the Edam's bows; (3) delay in reversing her engines; (4) failure to give notice of her porting by one sharp blast of the whistle; (5) her previous reduction of steam pressure; (6) too long intervals between her whistles.

The evidence on both sides shows that the whistles were given and heard at intervals not exceeding two minutes. This is all that is required by the rules, and no fault in that regard is proved. Article 19 of the new international rules, (4 Prob. Div. 244,) to which both these vessels were subject, providing for notice by short blasts of the steam-whistle to indicate the porting or the starboarding of the helm, is expressly made optional. If such a notice from one steamer is heard by another, still no obligation to answer it is

imposed by the rule. Nor was any evidence introduced to show that any custom to give such notices has become established, so as to render conformity to such a custom obligatory. In the absence of such an established usage it is impossible for the court to hold the giving of such notices obligatory, because that would contradict the clause of the statute rule that makes it optional. The other faults charged turn mainly upon, the question of the relative positions of the two steamers, and 656 this has been the point chiefly controverted. The testimony, aside from what relates to this point, does not present any serious conflict. The differences are comparatively small, not greater than are to be expected under circumstances so unfavorable to exact observation and accurate recollection; and they are capable of easy explanation. But, as respects the relative position of the vessels, the testimony is in direct contradiction. There is no question that the Edam was previously sailing E. ½ S.; the Lepanto, due west. Each contends that the other was to the southward of its own course,—the Edam insisting that the Lepanto was three or four points on her starboard bow, *i. e.,* bearing about S. W., and the Lepanto insisting that the Edam was about two points on her port bow, *i. e.,* bearing about W. S. W. Each accordingly, when the other's whistle was first heard, at once put its helm hard over, and steered to the northward, so as to give the other a wider berth. By so doing they brought about the collision which each sought to avoid. Had either or both kept her original course the collision would not have happened.

First. From the testimony I find no reason to doubt that both vessels were officered and manned by competent persons; that the officers and lookout were properly stationed, attentive, and alert; and that each vessel located the other according to the best observation and judgment attainable at the time. Each

acted upon this judgment in the way most prudent and natural, by steering away from the apparent source of danger, in order to give the other as wide an offing as possible. Nevertheless, a great mistake was niude by one or both of the vessels in locating the other; and this mistake was the original and prime cause of the collision. Erroneously locating a vessel by the sound of her whistle in a fog is not, however, necessarily a fault. Sound, like light, is liable to be deflected from its original course by reflection, refraction, or diffraction. When this happens, though the hearer locate correctly the direction of the sound as it comes to his ear, the source of the sound will be in a different quarter. Elaborate experiments on fog signals in this country and in England have established, beyond question, apparent anomalies and contradictions in the transmission of sound through the atmosphere, and a consequent liability to error as to the quarter in which the sound originates. Although opinions differ as to the comparative importance of the different agencies that produce these anomalies, all the observers agree substantially upon the fact of great aberrations in the course of sound and in the audibility of fog signals. It is now well settled that these aberrations are not due to fog, snow, rain, or hail, which produce little if any sensible effect on the transmission of sound. So far as known, these anomalies arise from the effects of winds, air currents, and a non-homogeneous atmosphere. See Appendix to Reports of American Light-house Board for 1874, 1875, 1877, by Prof. Henry; Appendix to Light-house Report of 657 1879, by Prof. Morton; Henry on Sound; Tyndall on Sound, (3d Ed.) pp. 9, 310, 351, 432; Prof. Taylor's "Recent Researches in Sound," Amer. J. of Sci. & Arts, January and February, 1876; Prof. Reynolds "On Refraction of Sound by the Atmosphere," L. E. D. Phil. Mag. July, 1875; Appleton's Annual Cyclop, for 1883, art.,

"Sound Signals," by A. B. Johnson, chief clerk of the Light-house Board.

While the experiments above referred to relate chiefly to the penetration of sounds and to variations in audibility, to aerial echoes, and to the observed alternate areas of sound and silence, they also embrace the deflection of sounds by reflection or refraction, as one of the modes in which the observed aberrations arise. It is now well established that areas of inaudibility may exist distant a quarter of a mile only in front of the blasts of the most powerful steam siren; while farther off in the same direction the sound may again become audible and loud, and remain so for miles beyond. Prof. Henry, in his report of 1877, (page 71,) shows that this may arise from an opposing wind, which refracts the sound waves upwards over the head of the listener, till they meet a different current, or strata of less velocity, when they may be deflected to the earth again; or it "may be considered as due to a sound shadow produced by refraction, which is gradually *closed in* at a distance by the *lateral spread of the sound wave* near the earth; or by the probable circumstance of the lower sheet of sound beams being actually refracted *into a serpentine or undulating course.* Such a serpentine course would result from successive layers of unequal velocity in an opposing wind." Appleton's Amer. Cyclop. 1883, p. 725. These phenomena, he adds, are observed especially in fog when the wind is ahead, (page 65.) Such, as it will subsequently appear, was the situation of the Edam in respect to the Lepanto's whistles. As the steam-whistle has no definite axis, such as the trumpet of the siren has, its lateral sound waves would naturally "close in" around areas of silence much nearer than those of the siren would do; and its aerial echoes, also, would come from a wider are of the horizon. "In the experiments at South Foreland," says Prof. Tyndall, (Sound, 318,) "not only was it

proved that the acoustic clouds stopped the (direct transmission of) sound, but in a proper position the *sounds which had been refused transmission were received by reflection."* Gen. Duane says that "a difficulty is sometimes experienced in determining the position of the signal by the direction from which the sound appears to proceed, *the apparent and true direction being entirely different."* Report of 1874, p. 104. He ascribes this result "to the refraction of sound passing through *media* of different density." Prof. Henry and Prof. Taylor find a more efficient cause in unequal velocities of the wind, which produce a deflection in the sound waves, and thereby change the direction of their progress. Mr. Johnson writes that "he has frequently been more than five points out of the way when trying to locate the direction of the sound made by a given fog signal." "I have even heard,"he says, 658 "apparently the sound overhead, when it was from five to seven miles away. It has been my habit to correct the observation of audition by looking at the compass, and to utterly distrust the ear as a means of determining the exact or even general direction of sound on the water."

When the sound waves reach the ear by any indirect course, whatever be the particular cause of deflection, the mariner in a fog is necessarily misled as to the true direction of the vessel from which they proceed, since he has no means of ascertaining or correcting the deflection, or even of knowing of its existence. In the recent case of *The Zadok,* 9 Prob. Div. 114, as well as in *The Elysia,* 4 Marit. Law Cas. 540, it was held that "failure to hear a fog-signal at a distance it might be expected to be heard, cannot be accepted as proof of negligence on the part of those who did not hear it." *The Negaunee,* 20 FED. REP. 918. Similarly, it must be held, upon facts so abundantly established as those above referred to, that where, as in this case, the officers are competent,

properly stationed, and alert, and have apparently formed the best judgment attainable at the time, mere error in locating another vessel's actual position by the apparent direction of her whistle, though the error be as much as five points, is not proof of fault; and, accordingly, I hold neither of these vessels chargeable with fault merely for its error in locating the other.

This liability to error is, however, well known to mariners. It was testified to on the trial. But while this fact excuses mere error in location, if the observations made be as correct as possible, it widens the obligations of prudence and caution. Knowing this liability to error, the mariner is bound to recognize the fact that there is still actual danger of collision, and that, though steering away from the apparent direction of the whistle that he has heard, he may, like one of the vessels in this case, be steering directly towards it. Under rule 18, therefore, he is bound to "slacken speed" to the lowest point compatible with the proper handling of his vessel; and, "if necessary, stop and reverse," until all doubt be resolved and all danger passed. For the libelants it is urged that by reason of this liability to error as to the position of the Edam, the Lepanto was in fault for changing her helm at all; and that, though she stopped and reversed her engines at once, she was bound to keep a steady helm until the course and position of the Edam were known with certainty. *The Louisiana,* 2 Ben. 371. In my opinion this rule can be justly applied only where the sound itself is so diffused as to be indeterminate in its direction, so that there is no good reason for going one way rather than the other. Where the sound comes apparently from a precise direction, to steer away from it furnishes, as a rule, the most probable means of escape. Great mistake by the deflection of the sound, though occasional, is comparatively infrequent; and steering away from the sound ordinarily gives, at least, the longest path, and 659 the most time in

which to stop before reaching the other vessel. It is, therefore, the most prudent course; and, when accompanied by the order to stop and reverse at full speed, it ought not to be held a fault. If this charge of fault were well founded, it would come with ill grace from the Edam, which changed her helm without reversing; but the concurrence of both masters in the same maneuver is evidence rather of the judgment of experienced commanders that such was the most proper and prudent course to adopt.

Just at what point a steamer in a fog, on hearing another's whistle, is bound to stop and reverse; or how the master is to know when that is "necessary" under the rule, is, to some extent, doubtless, a question of practical judgment. A steamer is not bound to stop and reverse at once, without reference to how distant the whistle may be, or may appear to be. Where the whistle is certainly distant, and no danger pan be incurred by delay, immediate stopping is certainly not necessary; but if it be *near,* or appear to be near, she is bound, at her peril, to do so. *The Frankland,* L. R. 4 P. C. 529, 534; *The Kirby Hall,* 8 Prob. Div. 71; if uncertain, she must slacken, or stop and reverse. *The George D. Fisher,* 21 How. 1, 6; *Peck* v. *Sanderson,* 17 How. 178,181. For her conduct in this reBpect, a vessel must, *prima facie,* be held to answer according to the event. It is always safe to stop and reverse; at least, as regards the charge of fault. If she does not stop and reverse, when it is shown by the event that by doing so the collision might have been avoided, she must establish a clear justification for her course or be condemned. *The Khedive* and *The Voorwarts, etc.,* 5 App. Cas. 876, 890, 908. "The rules are applicable from the time the necessity for precaution begins, and continue so long as the means and opportunity to avoid danger remain." *New York, etc.,* v. *Rumball,* 21 How. 372, 384. The whistles, or horns with mechanical appliances, required by the new regulations, (article

12,) are designed to make it certain that the signals shall be heard at a sufficient distance to render it possible in all cases for steamers to be stopped before coming in collision, if both vessels observe the rules, and have been previously going at "moderate speed;" and no steamer's speed can be held "moderate" that does not admit of her coming to a full stop within her share of the distance that separates her from another, after the latter's whistle is audible. But if a steamer is previously going at "moderate speed," and if she sails away from the apparent direction of the whistle as soon as it could be heard, and at the same time reverses at full speed, it is clear that she does all in her power to avoid collision, and no charge of fault in these respects can be sustained. *Peck* v. *Sanderson,* 17 How. 178, 181; *The Rhondda,* 8 App. Cas. 549, 556, 558; *The Sylph,* 4 Blatchf. 24. If both vessels do the same, in my judgment, no collision could arise under the existing rules; but if a collision should happen under such circumstances, all the rules being observed, it must be deemed to have arisen from unavoidable natural 660 causes, without the fault of either,—*i. e.,* by inevitable accident,—and the loss remains where it fell. *Stainback* v. *Rae, 14* How. 532.

Unless the Lepanto's evidence is in some way discredited, it must be held that she complied with all these requirements. Capt. Eogers on cross-examination, testified that the first whistle heard seemed *near;* and in answer to what he meant by "near," he said: "Well, less than a mile." In fact, the vessels, as will appear hereafter, were probably about 3,100 feet apart. The Lepanto's log says: "Heard a whistle close to our port bows." Capt. Eogers accordingly ported, and reversed full speed at once. The Edam did not reverse at all; and her previous speed was confessedly about seven or seven and one-half knots. This rate of speed has been repeatedly held not "moderate" for such steamers under similar

circumstances. *The Pennsylvania,* 19 Wall. 125; *The Colorado,* 91 U. S. 692; and see citations in *Clare* v. *Providence, etc.,* 20 FED. REP. 536. The Edam, as I have above said, was also bound, at her own peril, to reverse at once; for, by her own testimony, the first whistle heard seemed *near.* Capt. Taat testifies that at the time of the first whistle he formed the opinion that the Lepanto "was very close by." "I knew she was very close by, and I had to give way." In both these most important points the Edam was, therefore, in evident fault; so that, in this aspect of the case, if four and one-half knots be held a moderate speed for the Lepanto, without determining whether she was right or was wrong in locating the Edam, she must be held to have done all that was possible on her part to avoid the collision, provided her evidence is to be believed; while the Edam clearly did not do either what she might have done, or what the rules of navigation required of her. In effect, the Edam, while violating the rules, ran upon the Lepanto, while the latter was strictly observing them.

I find no warrant in the testimony for questioning the veracity of the Lepanto's witnesses as to what was done on board that vessel. Her log confirms them on all material points. The temptations to distort or falsify the truth in this class of cases are doubtless such as to demand careful scrutiny of the testimony; but where the testimony is found, as here, at all points consistent with itself and with the results; when it is natural and probable under the circumstances, and accords with the requirements of prudence and of the rules of navigation, and is neither impeached nor directly contradicted,—it must be accepted as the truth. See *The Khedive* and *The Rhondda, ut supra.* The only substantial contradiction in the evidence is as to the relative position of the two vessels. But this difference is apparent rather than real; as I have no doubt each heard the sound of the other's whistle in

the direction assigned to it. From the scientific point of view, according to the experiments above referred to, an error in locating sound is more likely to arise when the sound is moving against the wind; *i. e.,* when those hearing it are to windward, which 661 was the situation of the Edam here. But disregarding this theory, and considering the error of one or the other vessel as having arisen from some wholly unknown and unavoidable natural cause, the error would be as likely, *prima facie,* to have arisen on the one side as on the other; so that if there were no means of determining on which side the error arose, the Lepanto would be held without fault, on the ground that in her navigation, as above stated, she had, in any event, done all that was incumbent upon her. It must be observed, however, that if the Lepanto were actually in the direction assigned her by the libelants, her log, and her testimony as to her previous speed of only 4½ knots, and as to the immediate reversal of her engines, and her slow motion at the time of the collision, must all be deemed false and fabricated; for from that direction, viz., S. E. of the Edam, at whatever distance she might have been, she could not possibly have reached the point of collision except by traversing a longer path and hence by going at a higher rate of speed, than that of the Edam; and the latter was going at least seven knots, and did not reverse at all. If, however, the error in location were on the part of the Edam, no such incongruity in the testimony as regards the management of either vessel, or in other respects, save as to the green light, (of which hereafter,) would arise, but the testimony of both as to their navigation would become harmonious and consistent. The error, as I have said, being as likely to arise on one side as the other, if scientific hypotheses be disregarded, the ordinary duty of the court so to decide as to harmonize all the testimony, if possible, would, therefore, require the error to be assigned to the Edam rather than to the

Lepanto, if it could not otherwise be determined with certainty on which side the error lay.

Second. Disregarding, however, the direct testimony on both sides as to the bearing, or the apparent bearing, of the two vessels from each other, as inferred from the sound of their whistles, the other evidence does afford the means of tracing the course and position of each vessel backwards from the point of collision with an approximation to accuracy sufficient for all the purposes of this case. These means are: The previous courses of each; their rate of speed; the interval between the first whistles and the collision; their headings when they struck; and the rate of change of course under a helm hard over. A drawing of these positions and courses, such as I have annexed, prepared according to all that is most credible and accurate in the testimony on both sides, will answer almost all the questions which arise in the case. It reconciles nearly all the testimony, and at the same time renders it certain that a considerable error arose on each side. The larger and more important error, however, is shown to have been on the part of the Edam, the Lepanto being at the time of the first whistle about one and a half points on the Edam's port bow, instead of three and a half points on her Btarboard bow; and the Edam being about two-thirds of a point, instead of two points,662 on the Lepanto's port bow. The error on the part of the Edam was, therefore, a very material one, since it placed the Lepanto on the wrong bow. The error of the Lepanto was immaterial, because the Edam was rightly located on the port bow, and the error in amount could not have made any difference in the Lepanto's navigation or in her duty.

A few observations on the several *data* upon which the drawing is made, will state what I regard as directly established by the evidence; and the most probable estimates, where literal exactness is not attainable.

1. *The previous courses.* As to these there is no question. The Edam was sailing E.½ S.; the Lepanto, due west.

2. *Heading at collision.* This is given with precision by the officers of each vessel; the Edam headed N. E., the Lepanto, W. N. W. Both, indeed, Bay the blow was very nearly at right angles; and each, to make this out, states the other vessel to have been heading two points more to the northward. But it is evident that at night, and in a dense fog, neither had the means or the opportunity for taking an exact observation of the angle of the other's course with its own, while they did have the means, by their compasses, of taking an exact observation of their own courses. The officers have testified to these courses positively, and their statements of the headings at the time must, therefore, be accepted, instead of mere estimates of the lateral angle of the blow. The Edam consequently changed 4½ points in the interval; the Lepanto, 2 points. Before clearing, the Lepanto doubtless swung to the northwest or beyond. At the time of collision the Edam was under considerable headway; she cleared the first incision by "dragging past;" and as the Lepanto, 20 minutes later, was heading N. E.,—a change of 10 points, though her engines were at rest nearly all of that time,—it is evident that the collision gave the Lepanto's bows a strong swing to the northward; and it is probable that she was heading at right angles with the Edam, *i. e.,* N. W., or even northward of that, before she cleared the first contact. This would give the right angle that both sides testify to.

3. *The interval between the first whistles heard and the collision.* This was substantially the same on each vessel; for the log of the Edam shows that she "*answered*" the Lepanto's whistle. This means, necessarily, the proper long blast required by the rules; not the two short blasts mentioned afterwards, as a signal of starboarding, that were not heard. The

Edam's witnesses made no observations of the clock. The officers estimate the whole interval at two and a half to three minutes; the lookout at six minutes. The first officer finally said: "Two and one-half and two and one-quarter minutes is all guesswork; that is why I can't give you an answer, {as to the interval.} I didn't use any watch." Capt. Rogers, of the Lepanto, noted by the clock the times of the first and second whistles, and of the collision, as stated in the log; viz., 10:10, 10:12, and 10:15, respectively. 663 In his testimony he frequently speaks of the whole interval as five minutes; but he finally explains that he did not take the time of the collision until "half a minute or a minute after the vessels had cleared." It must have been at least a half minute after the Lepanto first struck before she cleared and got past the Edam, and it was probably more; and an additional half minute after she cleared would make a minute after the first blow. It is scarcely credible that while the two ships were afoul, or not yet out of danger, the Edam dragging past, and the Lepanto twice again running against her, the captain should turn aside, in such moments of extreme peril, to look at the clock. After they had well cleared, it is credible and probable enough that he should do so. There is good reason, therefore, for accepting his testimony on this point in explanation, and as a slight variation from the log. The chief engineer gives the same account of his taking the time at 10:15, "about a minute after the collision." The interval between the first whistles and the collision must, therefore, be taken to have been about four minutes.

4. *The speed.* The Lepanto's previous speed was "from four to four and one-half knots." I adopt four and one-half. The Edam's previous speed was seven to eight knots, according to the engineer. I adopt seven and one-half. I cannot consider the mere estimate of Capt. Taat from the deck, upon a densely foggy night, at "seven knots or a little less," as entitled

to preference over the engineer's testimony. The Lepanto's engines were reversed as soon as practicable. It took one minute for the engine to commence backing; a minute and a half more to get working full speed astern; and this left another minute and a half for work at full speed astern. All her witnesses, including one, a cattle-man, who is disinterested, say the Lepanto's forward motion was nearly stopped; the captain Bays the propeller's backwater was abreast of him; the chief engineer says that two minutes, after the engine was working full speed astern, would stop her; *i. e.,* an additional half minute. Counsel for the libelants argues that in five minutes, if reversed, she would have been going astern. I have no doubt the Lepanto was going at not above the rate of one knot at the time of the collision; her rate was probably less; I adopt one knot at that time. This was sufficient to accomplish the injury. Her average speed for the four minutes is, therefore, taken at two and three-fourths knots, and the distance run would be 1,100 feet.

The Edam's officers all say the order to "slow" was given when the first whistle was heard. The engineer in charge being killed, I assume that the order, if given, was obeyed. But the failure of the log to mention so important a circumstance in her own justification as the slowing of the engine, especially when the log shows that the officers' attention was directed to that subject by its mention just before that she was steaming "with moderated speed," necessarily subjects this testimony to suspicion. This suspicion is increased by the subsequent language of the log as to what took place when the 664 Lepanto was seen: "We could do nothing better than *to let the ship run on,* in the hope that she (the Lepanto) should pass astern of us;" and also by the testimony of the officers of the Lepanto, that the Edam's propeller, when she was nearly abreast of them, was heard working very

fast. Nevertheless, I am so indisposed to accept the alternative of a willful fabrication of evidence, that I adopt the testimony of the Edam's officers, that the order to slow was given, and consequently obeyed, because the order was a probable and natural one in itself; there is nothing positively contradicting it; and particularly, also, because, if the speed had not been slowed below seven and one-half knots, the Edam, in the interval of four minutes, would have run 3,000 feet, and would have changed her heading more than four and one-half points, as will appear below. The engine working slow would bring the Edam's speed, says Capt. Taat, from zero to two and one-half or three knots. She had an excess of speed, therefore, over the engine's slow rate of about four and one-half knots. If the Lepanto, with engines working astern for three minutes, and for half of that time at full speed astern, would reduce her speed from four and one-half knots to one knot, or even to half a knot only, the Edam, with her engine going at slow speed ahead and no reversal, could not have reduced her speed in the same time from seven and one-half knots to less than four and one-half knots. On slowing, her reduction at first would be at a little more rapid rate than later, and her average speed is therefore taken at five and three-fourths knots instead of six, the mathematical mean; and the distance run by her in the interval of four minutes would be 2,300 feet. A wholly independent mode of computation gives nearly the same result, viz., by—

5. *The rate of change of course under a helm hard over.* Capt. Taat, though testifying with reluctance on this subject, had some very definite knowledge concerning it. He had often observed such vessels on "trial trips" make circles with the helm hard over, and he says the time was from 10 to 12 minutes. Page 244." His own ship he had observed sometimes make 30 deg. change in a minute, and sometimes, at the

same rate, (of speed,) 40 deg. per minute. Page 224. He, is evidently speaking of the time occupied and the change when going at full speed, which, for the Edam, was, say, 10½ knots. When the speed is slow, as the testimony shows, the rate of curvature will be less; *i. e.,* the circle made will be larger. The two statements given by Capt. Taat well agree: 30 deg. in one minute equals a circle in twelve minutes; 40 deg. in one minute ("at same speed") equals a circle in nine minutes, or a variation from nine to twelve minutes. The reason of the difference the captain does not explain; possibly, the highest rate was when the Edam was light loaded. A circle in 10 minutes, or 36 deg. per minute, is equal, at ordinary full speed of, say, 10½ knots, to a change of one point in 328 feet; a circle in nine minutes, or 40 deg. per minute, equals one point in 295 feet; a circle in twelve minutes, or 30 deg. per minute, equals a point 665 in 394 feet. As the Edam, on this trip, was "very deeply loaded," and, after the first whistle, was running much below her full speed, her rate of change, under her starboard helm, cannot be taken to have been greater than the least rate stated; *i. e.,* a point in 394 feet. It was probably even a little less. That would give for a change of four arid one-half points (i. e., from E. ½ S. to N. E.) a distance of 1,773 feet. But to this must be added a period of at least one-third of a minute in which to give, receive, and execute the order to starboard, and to bring the vessel under its effect, during which time she would move on her former course 250 feet; and the same delay would occur under each subsequent order to change the helm. And there must also be added a half minute's forward motion of the ship for the time during which the helm was steadied. This, according to her rate at that time, would give some 250 feet more. These distances* together amount to 2,273 feet, which is very near the preceding independent estimate.

The Lepanto, at the same rate of change, viz., a point in 394 feet, would change two points in 788 feet; to which, if one-third of a minute's direct progress be added, viz., 150 feet, before the order could be executed and the helm felt, we should have 938 feet altogether. This is 162 feet less than the preceding computation; but as her average rate of speed was very low, not over two and three-fourths knots, and the action of the propeller was reversed, both which circumstances would, according to the testimony, enlarge the circle of her path, some such difference is not only accounted for, but must have existed.

These two independent modes of computation agree so nearly that they confirm each other, and I cannot doubt the result to be approximately correct. This result confirms, also, the testimony of the Edam's officers that her engines were slowed; for, if not slowed, her rate of speed during the whole interval must have been about seven and one-half knots; and this speed for the three minutes and a little over, during which she was actually under the effect of a hard a-starboard helm, would have given a path of about 2,350 feet, in making which she would have varied, at the rate above given, about six points, and gone nearly to N. N. E. instead of to N. E. only. It confirms also the Lepanto's story by showing its consistency; for her heading W. N. W. at the collision, or a change of but two points under her hard-a-port helm, could only have been effected by a short distance traversed, (or else by great delay in porting, which would be improbable, considering that the Edam's whistle was heard, apparently, only two points to port,) and hence by a low rate of speed, during the interval of four minutes; and the low speed sworn to agrees with the statement of her heading W. N. W. The same considerations show, also, that an interval of only two and a half minutes between the first

whistle and the collision, as contended for by the libelants counsel, is not only extremely improbable, but altogether 666 inconsistent with the libelants' other testimony; for, allowing one-third of a minute's delay before the Edam would feel her starboard helm, and one-third of a minute only for steadying the helm, we should have but one and five-sixths minutes in which to change four and one-half points. Now, the highest rate of change, under any circumstances known to Capt. Taat, was 40 deg a minute, equal (at ordinary full speed) to one point in 295 feet; and that rate of change would require a distance of nearly 1,400 feet for a change of four and one-half points; and to traverse this distance in one and five-sixths minutes would necessitate a continuous speed of over seven and one-half knots, without any slowing at all; and the whole path traversed by the Edam in the interval, on that hypothesis, would be about 1,900 feet. If, on the other hand, she were supposed to be slowing from a previous speed of seven and one-half knots, she would, at the end of two and one-half minutes, have traveled about 1,550 feet only; and deducting for delay in getting her helm to starboard and for her steadied helm, she would have had only a distance of 1,100 feet in which to change four and one-half points, equal to one point in 244 feet, or a change of over 48 deg per minute at full speed, or a circle in seven and one-half minutes,—a rate of change far above anything hinted at in the testimony of Capt. Taat. The libelants cannot have the benefit of contradictory conditions; and any interval much less than four minutes will be found to involve similar inadmissible conditions.

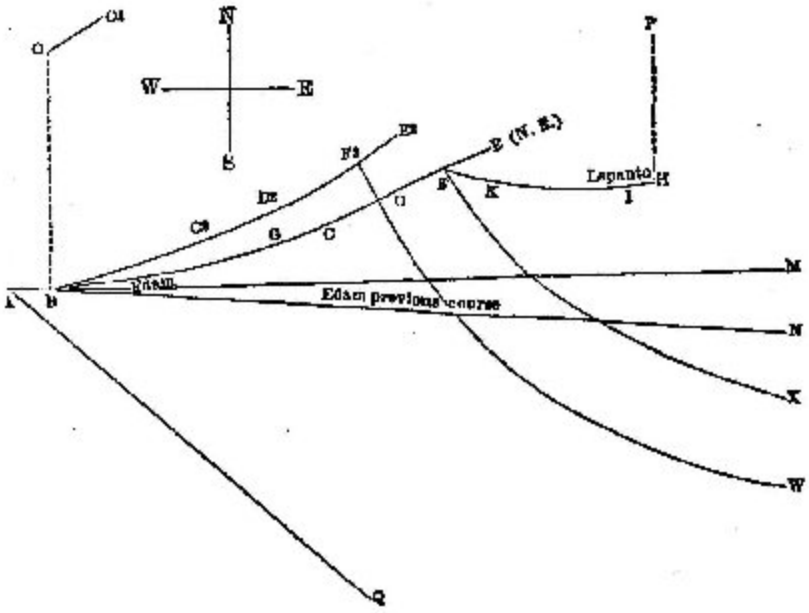
In the diagram annexed, A, E, represents 2,300 feet, the path traversed by the Edam, after hearing the first whistle, according to the *data* above adopted; H, F, 1,100 feet, the path of the Lepanto. The curves, B, C, and D, E, are drawn with a radius of 2,005 feet, the equivalent of a circle completed in 12 minutes when

going at a speed of 10½ knots, equal to a change of one point in 394 feet. The curve, I, F, is drawn with a radius of 2,400 feet, instead of 2,005 feet, to allow the Lepanto 875 feet, instead of 788, in which to make her change of two points, in consequence of her very slow speed and reversed propeller. The curves are drawn from O and P as centers, which are at right angles with the courses of the vessels at the time when they first got the effect of the hard over helm at B and at I, respectively. The curve D, E, is drawn with the same radius as B, C, from the point, 0^1 as a center, on the line, O, O^1, drawn parallel with and equal to the straight line, C, D, which represents the straight course of the Edam for a half minute under her starboard helm.

An inspection of this diagram shows clearly:

(1) That the Lepanto could not possibly have been in the position assigned her by the Edam's witnesses, viz., three and one-half points on their starboard bow. By no speed possible to the Lepanto, and by no conceivable course, her previous course being west, could she have reached and collided with the Edam at F, from any point what-soever, 667 on the line, A, Q, three and one-half points on the Edam's starboard bow.

(2) That the same result follows as to any less bearing on the Edam's starboard bow, down to the limit of at least one point; and that from no position whatever on the Edam's starboard bow could the Lepanto from a previous westerly course have reached the point of collision at the same time with the Edam, except by going a longer distance and at greater speed than the Edam, which would convict all on board the Lepanto, that have testified, of a willful fabrication of evidence. Thus, if the Lepanto were a half point, or a point only on the Edam's starboard bow, say at (500 feet E. of) X, or at W,



and changed a point under her port helm every 394 feet, and struck the Edam at F, or F^2, she would have been obliged to run four minutes, and travel 2,500 feet; and this would have required a previous speed of eight knots, diminishing to five knots only under a slow engine, and she would then have changed six points, and headed at the collision N. N. W., a result incompatible in every feature with either truth or honesty in the testimony on the part of the Lepanto's witnesses.

(3) That no green light of the Lepanto was seen by the Edam's officers three and one-half points off their starboard bow at the time of the first whistle; because the Lepanto could not have been there, nor anywhere approximating that direction; that the entry in the 668 log, and the lookout's testimony must therefore be accepted on that point, rather than the officers' testimony; that any such green light was seen only after the second whistle; if seen "immediately" after, *i. e.,* within half a minute, it was, doubtless, the Lepanto's white light, as a white light in fog sometimes, as appears in proof, shows green. This is rendered somewhat probable by the context in the log, which

indicates that the sight of the green light was the reason for steadying the helm; viz., "believing all was clear,"—a natural belief when that light apparently became visible. This would be a minute and a half before the collision, and at the time when the Edam's mast-head light was seen from the Lepanto. Both white lights ought to have been seen at the same time, and probably were so. The terms "immediately" and "at once" are used so indiscriminately by the Edam's witnesses, especially by the quartermaster and the seamen, as to everything that took place after the second whistle was heard, as to be nearly unintelligible; literally, they would leave scarcely time for anything to be done between the second whistle and the collision; yet we know that much was done, and that the interval was about two minutes. The lookout was in a position to see the Lepanto's real green light some 10 or 15 seconds before the collision; and according to his last statement that may have been what he saw. Gal only saw her red light; De Grad saw her white light a short time after the second whistle.

(4) No minor differences in the evidence as to the *data* upon which the diagram is drawn, such as the rate of speed, the distance run, or the interval of time, would make any material difference in the result. Nothing short of such great differences as would involve perjury in the testimony on one side or the other would be material.

(5) The bearing of the Edam's white light when first seen, viz., W. S. W. from the Lepanto, is very nearly approximated in the drawing, and is an independent circumstance which corroborates the Lepanto's story. As I have said above, it was doubtless seen, as the Lepanto's witnesses state, about one and one-half minutes before the collision, and probably at about the same time that the Lepanto's white light, showing green, perhaps, was seen on the Edam, when the Edam was at G and the Lepanto at K.

(6) Had either or both held her original course, no collision would have happened.

(7) Had the Edam reversed at full speed, as the Lepanto did, though previously going at seven and one-half knots, or even had she been previously going at a moderate speed—say half speed, or five and one-quarter knots—and had slowed only, in either case the Edam would have reached the Lepanto's track at least two minutes later than she did, and the Lepanto would then have been well out of the way; and the Edam, in passing over her actual path of 2,300 feet, would, had she reversed her engines, probably have been stopped before reaching the Lepanto's track at all, as she certainly 669 would have been Btopped had she been previously going at moderate speed and reversed also.

(8) No change of the Lepanto's helm to starboard when the Edam's white light was seen, say at K, 250 feet from P, and one and one-half minutes before the collision, could possibly have affected the result.

(9) Four and one-half knots was a "moderate speed" for the Lepanto, under the circumstances of this case; not only because, as Capt. Taat says, that was not much more than fair steerage-way, *(The Zadok,* 9 Prob. Div. 114,) but also because it was such reduced speed as enabled the Lepanto to come to a full stop long before sailing over her share of the distance that separated the two steamers when their whistles were first heard, and because the evidence shows that she would have been stopped within those limits before collision had not the Edam run within the Lepanto's share of that distance through her own immoderate speed. *The Leland,* 19 Fed. Rep. 771, 779.

(10) That the Lepanto's reduction of steam pressure was not such as to constitute a fault; because this reduction did not cripple her resources for sufficiently rapid handling in the emergency, nor render her unable to perform her whole duty by coming to a full

stop within the limits required of her, viz., her share of the distance between them after the Edam was discovered; and also because there is no evidence that the reduction of pressure was beyond what was usual, or what was necessary for mechanical reasons and for the safe working of the machinery under slow speed. The remarks cited by counsel from the case of *The Hansa,* 5 Ben. 501, cannot be properly applied under such circumstances. There is no arbitrary requirement that a steamer in a fog shall maintain in her boilers the utmost head of steam pressure that her certificate of inspection allows. The Edam also reduced her pressure. That, I infer, is the usual and proper course. If the reduction of pressure by the Lepanto was excessive, that fact should have been proved by some evidence. There was no direct evidence on the subject. The clear inference from the other proof is that the reduction was not excessive.

The counsel for the libelants insist that there must have been delay in the engineer's obeying the Lepanto's order to reverse, because he estimated that two minutes time was sufficient for stopping the Lepanto after her engines got full speed astern, while the log shows an interval of five minutes between the order and the collision. I have already stated why I think the interval was but four minutes. In another branch of the argument the counsel claims that the whole interval was but two and a half minutes. Four and a half minutes were sufficient to stop, according to the engineer's estimate; and all the claimant's witnesses insist that the Lepanto was very nearly stopped when she struck. Their testimony is consistent in this respect; and though it be uncertain within the fraction of a minute 670 just how long the interval was, there is no reason for supposing that the engineer's estimate of the time required to stop is any more exact. * No estimate is of much value unless based on observed facts. A wide difference between the

engineer's estimate and the testimony would, indeed, arouse suspicion as to the truth of the testimony. But here, at most, the difference is slight; the basis of the engineer's estimate does not appear; while the testimony as to the fact of prompt reversal is as clear, full, and explicit as possible; and it is an essential part of one consistent narrative. There is not a single fact proved in the case that contradicts it, or is inconsistent with it; and it could not be discredited by the mere estimate of the engineer as to what might be done, even if his estimate were not exactly in accord with the time proved; whereas, in fact, it agrees with it.

This approximate determination of the positions and courses of the two vessels, according to the best evidence on both sides, agrees with the general considerations first above stated, in absolving the Lepanto from blame, and in fixing the sole responsibility for the collision on the Edam. The weight of evidence shows that the Lepanto made no material mistake in location; that she violated no statute, no custom, no requirement of prudence or of nautical skill; that the collision was brought about, primarily, by the Edam's erroneous location of *the* Lepanto upon her starboard bow, instead of on her port bow, and that this error arose, doubtless, from unavoidable natural causes, and was not in itself a fault; but that the collision was caused, secondarily, by the Edam's previous non-observance of her duty to go at moderate speed, and by her failure, on hearing the Lepanto's first whistle near, to reverse her engines, as she was also bound to do. Had both of these duties been observed by the Edam, the collision would certainly have been avoided; it would probably have been avoided had either of them been observed. The Lepanto, having made no material mistake in location, and having observed all the rules of navigation, and done all she could do to avoid the collision, cannot be justly charged with any share of the loss. Great as this

loss was, it must be borne by the Edam, whose faults alone, so far as there was fault, produced it.

The libel is dismissed, with costs.