COLLISIONS AT SEA.

HOW THEY ARE CAUSED.

"HARD A-PORT; FULL SPEED ASTERN."

A meeting of the Royal Society of Tasmania was held on August 14. Mr. Bernard Shaw, I.S.O., presided over a gathering which scarcely numbered a score, owing to the meeting clashing with other functions taking place in the city that evening. His Excellency the Governor sent a letter of apology for his non-attendance.

Mr. W. F. Ward read a paper upon "The effect of reversing the screw on the steering qualities of a ship, with an explanation of the Togo-Alice collision." He feared that neither the navy nor the mercantile marine had yet assimilated the vital facts bearing on collisions with which he dealt. If this opinion were wrong its expression could do no harm; if right, much good should result. He began with an illustration. One night in April last, when the steamer Togo was going down the River Tamar, and the yacht Alice was steaming towards her, both going at full speed, the captain of the Togo judged that a collision was practically inevitable, and gave the orders "Hard a-port;" "Full speed astern." These were promptly carried out, the collision was duly brought about, and ten valuable lives were lost. The correctness of these orders had not been questioned, in or out of court, and it might be assumed, therefore, that they were generally regarded, even to this day, as safe and proper under similar circumstances of impending collision. He would submit, however, reasons for believing that these two orders combined, so far from making for safety, were, in their combined effect, the actual and direct cause of an otherwise avoidable collision. Not only this, but that, in similar circumstances, these orders were wrong in principle, that they have led to many collisions in the past, and unless discredited, would lead to more in the future.

These reasons were founded on actual experimental results obtained by a British Association committee, which consisted of Sir W. Thomson, F.R.S. (now Lord Kelvin), Professor Osborne Reynolds, F.R.S., Mr. J. R. Napier, F.R.S., and Mr. W. Froude, F.R.S.

Following up a series of experiments on models by Professor Reynolds (report of B.A., 1875) this committee reported (1876) as follows:—"The experiments of the committee on large ships have completely established the fact that the reversing of the screw of a vessel, with full way on, very much diminishes her steering power, and reverses what little it leaves, so that where a collision is imminent, to reverse the screw and use the rudder as if the ship would answer to it in the usual manner, is a certain way of bringing about the collision, and to judge from the accounts of collisions, this is precisely what is done in nine cases out of ten."

Further, the committee went on to report: "It appears that a ship will turn faster, and for an angle of 30deg., in less room when driving full speed ahead, than with her engines reversed, even if the rudder is rightly used. Thus when an obstacle is too near to admit of stopping the ship, then the only chance is to keep the engines on full speed ahead, and so to give the rudder an opportunity of doing its work."

The speaker illustrated his address with diagrams. The first showed approximately the effect of reversing the screw of one of the experimental vessels. The screw was reversed at a point called E, and the vessel was in position D at the time when she had lost half her way. Another point (C) showed the position reached in the same time when the screw was not reversed, the helm in each case being hard a-port. By the time she had lost all way this vessel was heading 30 degrees to port of her original direction, whereas had her screw not been reversed she would have headed 60 degrees to starboard, so that the total effect of reversing was to turn her through 90deg.

The committee, he stated, said: "A glance at the diagram is sufficient to show what a fatal mistake it must be, when a collision is imminent, to reverse the screw, and then use the rudder as if the ship would answer to it in the usual manner." A second diagram was a sketch applying these experimental results to fairly meet the evidence given at the inquest, although much of this was contradictory. The first point (A) suggested the position the Togo would have reached had her screw not been reversed; the second (B) her possible position owing to reversal; and the third (E) where her screw was reversed. The Alice was heading for the bank, and the Togo was shown striking her practically at right angles, as stated by her captain. That something like this must have taken place was supported by the fact of the collision occurring at right angles, for it was known that the vessels' helms were both hard a-port. If both were answering their helms properly it would appear that, if they struck at all, they

would meet either almost bows on, or at an oblique and glancing angle. Here, then, was further support for the contention that, owing to the reversal of the screw, the Togo, instead of going to starboard and safety, as intended, actually went to port against her rudder, and so into collision. Counsel, at the inquest, several times asked in vain for an explanation of this remarkable position at right angles.

Variations due to differences in ships; to right or left-handed screws, and their effects with helms to port and to starboard; the steering effects produced by reversing from full speed astern to full speed ahead; and other important details, were given in the reports of the committee. The Admiralty, at the request of the committee, furnished details of trials made with two large ships, and these confirmed the committee's conclusions (B.A. report, 1880).

These results did not reach the committee for nearly 3½ years; it was possible that they have remained still practically unknown, and that some of the "numerous collisions between the ships of our own navy," mentioned by the committee as occurring while they were endeavouring "to execute ordinary movements," might still be repeating themselves, owing to unexpected alteration of direction, due to the reversal of screw reversing the rudder's action. Cable news had recently been received that eight destroyers had been damaged in a fortnight. Vessels of this class train in squadrons, sometimes at night, without any lights, and they ran, therefore, unusual risks of collision. They had, however, twin screws, but it seemed not improbable that in their case also some analogous effect of reversal would best explain vague statements as to failure to answer helm, or failure of steering gear to act at a critical moment.

In conclusion, he claimed that the importance of the subject justified bold argument from the particular to the general, and submitted that, at the very least, he had made out an overwhelming case for experimental trials with the Togo, as a first step towards ensuring public safety in the future.

Mr. A. O. Green contended that mariners were acquainted with the effect which the reversal of the screw had upon the steering qualities of ships. But to ask a captain to dash full speed ahead, relying only upon the action of his helm, was to ask him to undertake a very great risk. The approaching ship loomed up big in front of him, and the question was whether he would be able to clear the large arc on the horizon. If he went full speed ahead with a full helm and failed to clear the ship in front, the collision would be as bad as it could be. Yet he knew that while he reversed his engines, and was lessening the blow, he was, at the same time, more likely to incur a collision. But he knew further that if he did reverse his engines and gave the order "hard a-port," he was sure of obtaining greater consideration at the hands of the subsequent court of marine inquiry than would the captain who had determined to dash "foolhardily ahead."

Further points of detail were discussed.

Mr. Ward, in reply, said he realised that the idea had yet to be driven into the minds of courts of law. They should acknowledge that the man who drove ahead was in the right.

Mr. Ward was accorded a vote of thanks by the meeting for his paper.