

## DISCUSSION.

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The President (Mr. W. H. German) said that in spite of the author's apology for having worded his paper in what he styled a somewhat general and popular form, he (the speaker) was sure that it would be admitted that it had been a most interesting paper; and he thought that it would lead to a very useful discussion, and thus form a valuable contribution to our volumes. It was rather an unusual subject, as far as our Association was concerned, but he was sure that it was one that would appeal to all who had watched the gradual evolution of the ferry steamers in our harbour. As the author pointed out, the "Wallaby" was really the first double-ended screw boat to run on the harbour; and he was pleased to see that the designer of it, Mr. Norman Selve, was present. He had the pleasure of being a resident of North Shore when she first started, and he had travelled in her many a time; and observed her graceful proportions, and the fact that she still continued to run and give good service was a credit to her designer, constructors, and owners. Then, further, in connection with double-ended steamers, he, a resident of Manly, had travelled by the boats of the new ferry company, and he thought it reflected great credit upon the management of the concern that it had the pluck to at once go in for the double-ended screw boat. It was a wooden one, and they certainly had had trouble with it, for, as the author had said, the great difficulty, especially with a wooden boat, was to keep the shaft in line. In the Manly service that trouble was more pronounced owing to the heavy seas the boats had to cross.

Mr. Norman Selve, in proposing a vote of thanks to the author for the unreserved way he had placed before them his unique experience and universal success with double-ended screw boats, said he would like to ask the author if he had ever given any thought to the subject of driving the screws by two separate engines, or on Rankine and Blackmore's system each cylinder driving its own screw. He had heard of a ferry boat having four screws—two at each end—on the Birkenhead ferry. He had no particulars of the latter type, and he thought there would be no particular advantage in having four screws. While thanking the author for his paper, he was sorry he had fallen into a great mistake, one which was corrected in the Association many years ago, and which had been alluded to by the President, namely, Captain Bremner's connection with the design of the "Wallaby." He would like to make the whole matter clear. They had to turn back to the records of the Association for the true facts. When the North Shore Ferry Company was first formed, and bought the boats from Mr. Milson, it offered by advertisement a premium for the best design of a new ferry boat,—the magnificent premium of £10 10s, and out of pure derision he sent in ten designs. They were coloured as highly as possible. He sent no accompanying letter marked with a motto for identification, but all the designs had a big monogram, N.S. conjoined, followed by **N. S**<sup>ORTH</sup><sub>HORE</sub>, and that was all the indication that was on them. In due course he received a letter that the "advertised premium of ten guineas" had been awarded to his design for the boat with the screw at both ends. The cheque was enclosed in the letter, and duly banked, and the letter was afterwards exhibited in the rooms of the Association. Although Captain Bremner sat on the board, and no doubt supported the design, he should

not be credited with the authorship of the design of the "Wallaby." He had no more to do with the design of the double-ended screw boat than any other member of the Board, but no doubt he voted for that design. Still, he was simply a member of the Board of Directors of the Company. As a matter of history it is only right that the exact facts should be known, and that the records of the Engineering Association should be kept correct. In conclusion, Mr. Selfe said that for size and equipment he had never found any part of the world that could surpass Sydney for the special requirements in the character of her ferry boats.

Mr. Johnson said that as one of the new members of the Association he had much pleasure in speaking. As Manager of Watson's Bay Ferry Company he had some experience in double-ended single screw ferry steamers. The "King Edward" was originally a double-ended steam ferry boat, but was now worked with a single screw. He had tried her both ways; and with pulling and driving with the single screw she was only five seconds out in the mile. The one was against wind and tide; but taking all into consideration, there was very little difference. It was a hard thing to be able to tell, because under conditions like these in the harbour, it could not be done well, as the strength of the current was not known. With wind and current against the boat, it was almost impossible to get true and absolute steaming conditions; the experiment would have to be made in a tank. The "Vaucluse" was the "Cock of the Walk." She was giving good results; there was no mistake about that. Of course she was not designed as a double-ended single-screw propeller vessel. He thought it was a very wise thing to suggest that the discussion be adjourned, so as to give members an opportunity of getting more information on the subject. He himself

came there to learn something, and he hoped he would do so.

Mr. A. Christie said he did not think it wise to make any remarks at present, as the subject was of too much importance to discuss without consideration. There were many present interested in ferry boats, and he was sorry they had not spoken, as he thought it was proper for them to take up the question of their own particular class of boat. He moved that the discussion be adjourned.

#### ADJOURNED DISCUSSION ON MR. WALTER REEKS' PAPER.

The President (Mr. W. H. German), announced that the business of the evening was the adjourned discussion of Mr. Walter Reek's paper, "Double-ended Single-screw Steamers." In the meantime, as you doubtless know, members have been notified by the courtesy of the Directors of the Balmain New Ferry Company, the double-ended boat with the single screw, the "Lady Northcote," had been placed at the disposal of the Association in order that trials might be held. These trials were made, and as Mr. R. Sinclair was good enough to take charge of the experiments, and had prepared a report upon the trials made, he would call upon him to read it.

Mr. Russell Sinclair then read the report of the Committee as follows:—

"The directors of the Balmain New Ferry Co., having courteously placed this vessel at the disposal of the Association, the offer was accepted, and a committee appointed by the Council to carry out the tests and furnish a report on the same, consisting of Messrs. R. Sinclair (Vice President), A. Christie, J. Macartney, D. Borthwick and Walter Reeks, and the trials were car-

ried out on the 25th July; a number of the members of the Association also being present.

“The routine of the trials was as follows:—

“The draft was checked in smooth water at the wharf and noted as 9’0” mean.

“The wharf was left at 2.15, p.m., and as high water had occurred at 10.46, a.m., the vessel was at once taken over the measured mile, so that all the runs were carried out during an ebb tide, and therefore all the runs from Pinchgut to Bradley’s are with the tide, and all from Bradleys to Pinchgut against the tide.

“There was a slight southerly wind, nearly abeam.

“Full speed trials over the mile were first taken:—

First, run down, propeller aft driving.

Second run,           ”           ”           ”

Third, run down, propeller ahead towing.

Fourth, run up,           ”           ”           ”

“Progressive trials were then run, reducing the revolution by 20.

Fifth, run down, propeller ahead towing.

Sixth, run up,           ”           ”           ”

Seventh, run down, propeller aft driving.

Eight, run up,           ”           ”           ”

“The speed was then reduced by a further 20 revolutions, and the four runs 9th, 10th, 11th, and 12th, repeated in same order as the 5th, 6th, 7th, and 8th. During the continuance of each run three sets of indicator cards were simultaneously taken off the H.P. and L.P. cylinders, there being an indicator on each, each set being as near as possible at the beginning, midway, and towards the finish of the measured mile.

“The cards were carefully worked out and the averages recorded for I.H.P., speeds, and co-efficient of performance by the formula

$$\frac{D_3^2 \times 5^2}{\text{I.H.P.}}$$

The full results being tabulated as on Table I.

Speed curves have been plotted from these results.

Plate XIII., Fig. 1, being the curves when propeller driving.

Plate XIII., Fig. 2., being the curves when propeller towing.

“The behaviour of the vessel when stopping, starting, and steering was tested, and the results are included on the table.

“During the trials the draft was checked by Messrs. Reeks and Christie, and the displacement calculated by Mr. Reeks.

“The times over the mile and the steering trials were officially noted and checked by Messrs. Macartney and Reeks.

“The steam pressures and revolutions were taken and checked by Messrs. Christie and Borthwick.

“The indicator diagrams were taken, and the powers and co-efficients calculated by Mr. Sinclair and assistants.

“Mr. Christie worked out the speed curves.

“The object in thus detailing at length the routine of the trials is to place on record that every effort was made to obtain reliable and accurate data of the performance of a vessel of this type. And the Committee have purposely only detailed the results obtained in the report, leaving members to state their individual opinions during discussion.

“The Committee desire to place on record their thanks and appreciation of the courtesy and liberality of the Directors of the Balmain New Ferry Co., who gave every facility for the carrying out of these trials.”

The President then called upon Mr. Christie, as mover of the adjournment of the discussion.

Mr. A. Christie considered that the author's paper should be taken as a supplement to the paper he read before the Association some years ago on "Double-ended Ferry Steamers." In his paper he had kindly placed before us the experience he had gained in designing ferry steamers since that time, and he (the speaker) was sure the members thoroughly appreciated his kindness in so unreservedly placing that experience before us and the conclusions arrived at as to the best method of propelling double-ended steamers.

In dealing with a subject like the one under discussion it seemed to him to be almost impossible for each of us to see it in the same light, but as the author said his object was to have more light thrown on the subject, he was sure he would not object to honest, candid criticism. The subject was too important to allow personal feelings or bias to influence us in any way, and in his opinion we should endeavour to deal with the matter thoroughly from an engineering point of view. When the author read his previous paper on Double-ended Steamers he was an advocate for a screw at each end, and held it was an economical method of propulsion, but he also informed us that boats built with straight keels were wrong, that the proper method was to have the keel turned up from end to end, or what is termed a "rocker keel."

He (the speaker) did not agree with him then, neither as to the method of propulsion being economical nor as to the "rocker keel" being the best way of building double-ended steamers, and he had never seen any reason why he should alter the opinion he then held.

He noticed by the diagrams the author had placed before us that he started with a straight keel boat, next

a high rocker keel, afterwards a low rocker keel, still later with a partially straight keel with the deadwoods cut away, his latest production being a straight keel boat, which he candidly told us was a necessity for successful propulsion with a single screw in double-ended steamers; so he had completed the circle and come back to where he started from, viz., straight keel steamers.

We now come to the subject of the paper under discussion, viz., double-ended steamers with only one propeller, that was to say, the boat was driven alternately with the propeller at the bow and at the stern. Now, the question one naturally asked was why the change was made, especially in the Balmain ferry boats, seeing that they were built with double screws, and what benefit was to be derived from the change.

The author stated that it was the result of an accident, when it was found that the boat did all right with one screw, but this could not be the whole of the reason, because if the boats were liable to have their propellers damaged, surely it would have been more prudent to have kept the two screws, so that in case one got damaged the boat could still run the service with the other. But the author gave the real reason in another portion of his paper when he said that the difficulty was in keeping the shafting in line. There was no doubt in his mind that this was the sole cause of the change, but this did not seem to be an insuperable difficulty, because there were plenty straight keel boats running in the harbour having double screws which had never given any trouble in this direction, in fact one of the oldest boats in the Balmain service had a straight keel, and was still run with a screw at each end. This seemed strange, if the Directors were so convinced of the remarkable benefits to be derived from having one screw less.



Plate XII. shewed the distortion which took place in the shaft alignment in a double-ended screw boat which came under his notice, and which he thought plainly shewed the necessity of altering the method of construction.

The author evidently anticipated that with double-ended double-screw boats the engines would have to be lowered when lining up the shaft, and there was no doubt in many cases he was quite correct, but that would depend on the style in which the boat was built, but there could be no doubt that the diagram shewed conclusively that in this case at least the engines wanted lifting.

The author claimed for the particular class of boats under discussion "at least equal handling power." This he understood to mean handiness in starting, stopping, steering, getting along side wharves, and such like. He (the speaker) had given this matter particular attention lately, as he had to travel by that class of boat daily, and he had no hesitation in saying that they were not nearly so handy as boats fitted with double screws. He happened to travel the other day with a double-screw boat, and they had occasion to stop about 50 yards from a wharf to allow another boat to leave; on starting again the vessel did not vary from her course in the least, and went alongside the wharf splendidly, a feat that would have been impossible with a double-ended single-screw boat.

Amongst other claims was one that seemed to him to be somewhat curiously worded, viz., "Equal average speed with the advantage of a little better speed one way of going." Did this mean that the mean speed of a single-screw boat was equal to the speed of a double-screw boat, but having the advantage of a little better speed one way of going? If that was so, then we must