

LLOYD'S REGISTER,  
LONDON.

REC'D 2 AUG 1923

ANSW

Emsworth

31 July 1923.

Dear Mr Scott

I have read through the Reports, etc regarding the S.S. Nausicaa and return them herewith. I think perhaps the case has been thought to be more serious than it actually is. The Antwerp surveyor who first drew attention to it stated that there were approximately 35 plates more or less affected as well as a large number of rivets, the starboard side being worse than the port side. He explained why he could not state the number with precision, but his wording "more or less" implies that he included cases of very slight corrosion.

The plan of plating of the starboard side submitted by the owners with red markings indicating the position of the corrosion upon 35 plates must have included in the markings the location of the corroded rivet points as the plates exceed in number those reported by the Nantes Surveyor who examined the vessel at St Nazaire. He has carefully detailed each case of a corroded plate mentioning some which are not marked on the plan. He specifically mentions three on the starboard side as being the worst and states that the others are at present of little consequence. He mentions altogether 21 plates on the starboard side and 7 on the port side and also records that a number of rivets

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throughout the bottom, as well as in the corroded plates are more or less wasted but apparently not to a sufficient extent to necessitate their immediate renewal.

During the survey at St Nazaire the corroded and pitted plates were thoroughly cleaned and painted before the bottom was recoated. Eight small pieces were trepanned out of two of the most affected plates and sent to the Ecole des Arts & Metiers at Paris for analysis & microscopic examination.

Three months after this survey the vessel was examined afloat at Rouen. Only 6 of the corroded plates could be examined, including one of the three worst. It was found that these plates still retained the preservative paint applied at the previous survey, so it is hoped that the corrosion has been arrested.

Four Analyses were made from the pieces trepanned from the plates. Analysis A was made from pieces cut from the corroded part of plate N<sup>o</sup> 9. Analyses C & D were from the corroded parts of plate 8 whilst Analysis B was from material from the uncorroded parts of both plates mixed together. All four analyses are practically identical. Apparently the pieces were too small to permit of an analysis for carbon, but from the micrographic examination, which is a reliable method when carried out by an expert, it was estimated to be 0.20 per cent. The Phosphorus was low averaging 0.026 per cent and the Sulphur extremely low being less than 0.01 per cent. The manganese was rather low, viz 0.45 per cent. This element is thought by



some to be an active agent in producing corrosion. There is nothing in the Analyses to indicate that the steel was inferior in any way.

Four very small pieces were submitted to micrographic examination. One was from an uncorroded part of one plate, the other three from corroded parts of two plates. Several microphotographs are described taken from these 4 specimens. From the descriptions the structure does not appear to be unusual. It is stated that the steel was of the "ordinary formation" & again that the structure was "almost normal" at the sides of the plate (This must mean the surfaces). In the middle of the thickness some segregations were found. This, by the way, is not unusual when the specimen is taken from the part of a plate which corresponds to near the top of the ingot as segregation to some extent occurs in every ingot. When considering microphotographs it must be remembered that the magnification is great, so that the "large impurity" mentioned on page 8 as being in the middle of the photograph is really so small as to be invisible without microscopic aid.

It is stated that the segregation of the impurities was in the middle of the thickness & that it did not extend sufficiently to reach the corroded surfaces, it is therefore evident that the corrosion was not caused by the segregated impurities.

The impurities actually mentioned in the



report are ferrous & manganese sulphides and ferrous oxide. The former are found in all structural steel, and in view of the exceptionally small sulphur content in this steel they must have been present in less than the usual proportion.

There is nothing in this report to give the least indication that the quality of the steel was at fault. The fact that the rivets (which are most probably iron) in all parts of the ship's bottom besides those in the corroded areas, were more or less corroded on the points indicates that the corrosive influence was widespread & was not inherent in the steel.

The Nantes surveyor suggests that 5 of the patches of corrosion are in positions where shores & launching ways might have prevented the application of paint. It would appear from the <sup>documents</sup> Belfast Surveyor's letter of 8<sup>th</sup> Feb 1923 & Mr Ward's letter of 9<sup>th</sup> Feb. that the vessel had not been in dry dock for painting since she was launched until the corrosion was discovered at Antwerp, it is therefore very probable that absence of protective paint from the corroded surfaces and rivet points is the real cause of the trouble experienced. If this supposition is correct and if due attention is paid to the places in future no further deterioration is likely to occur.

Yours truly  
J. J. Mutton

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For the Chief Ship Surveyor

A.S.

2/8/23

from Kidman  
to note

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