

produce it; what is its danger in coal-bunkers and petroleum-carrying steamers; what are the uses of switches and cut-outs, and why it is so important to prevent short-circuiting taking place.

Candidates will be required to give written answers to sixteen out of twenty questions in engineering knowledge. These questions will not be difficult, theoretical, or book questions, but such as any man of ordinary capacity who has a fair amount of practical knowledge of the use and working of the steam-engine ought to answer.

Examiners will require all candidates to fill up a Form Exn. 15B, and they will forward it to the Chief Examiner of Engineers with the report of the examination.

If a candidate refers to any book, paper, or memorandum, or obtains information from another candidate or any other person during [the examination, he will be treated as having failed, will forfeit his fee, and will not be allowed to be re-examined for such period as the Marine Department may determine.

The Examiners will report, in the case of failure, the nature of the question or questions that decided the failure, or the point in the management of the engines or boilers in which the candidate was deficient.

Applicants for the voluntary examination need not necessarily have served on board steamships; all that is required is that they shall have a practical knowledge of the use and working of the steam-engine.

Practical knowledge is best gained in the engine-room; and the examination of an officer who does not produce official evidence of service in steamships, and of experience of engines, must necessarily be more searching than in the case of one who produces evidence of such service and experience.

The answers to the questions in engineering knowledge are frequently given by candidates as learned by rote from a book. Candidates should therefore be asked such *viva voce* questions as will necessitate answers in different words, so as to discover whether they have the root of the matter in them.

A large part of the *viva voce* examination should be conducted on board a steamer, preferably one with which the candidate is unacquainted. He should be told to look about and try to find out the arrangement of the machinery without assistance, and the Examiner should be in the engine-room to see that this independent examination is properly carried out. When the candidate reports that he thinks he knows the arrangement the Examiner will question him on the uses of the parts, get him to point out the different cylinders, pumps, valves, condenser, &c.; also the dynamo, its field magnets, armature, commutators, brushes, cables, &c. The candidate must show that he understands the run of the pipes in the bilges, not necessarily that he has gone over every one of them, but he ought to be directed to trace at least one important range of pipes, and to thoroughly satisfy the Examiner that he could be safely trusted to manipulate the valves or cocks in connection therewith. It will not often be practicable for the candidate actually to work engines under steam, but he must satisfy the Examiner that he knows how to do so, and that he is aware of the precautions to be taken in regard to water in the cylinders, &c. It is most important that a candidate should show that, in the event of an accident depriving him of the assistance of engineers, he knows what to do to safely take his vessel to an anchorage, or to stop the engines and proceed under sail alone.

The examination of a mate in steam is the same as that of a master. The knowledge required has no reference to the mate's position.

A mate may be examined, but such examination implies that the mate possibly may one day be a master, when the possession of the knowledge will be an advantage to him in the discharge of his duties.

#### APPENDIX G.

##### SIGHT TESTS.

**178. Conduct of the Tests.**—These tests must be conducted under the strict personal supervision of the Examiner. A careful record must be kept of all mistakes made by the candidate both in the letter test and in the lantern test.

Each Examiner must keep a record of all candidates passed by him, for reference when required.