

tion right through. We had to consider the question, and it was found to be impossible with the plant we had to construct those engines. One of the directors and myself went down to see Messrs. Ransom and Gow, the manager and superintendent of the Northern Steam-ship Company, and pointed out that we could not build the engines owing to the size wanted. They were perfectly satisfied with the work that we could do. I had also information from Captain Anderson, a neighbour of mine, who said that if we could have built the engines we should have got the order, but it was purely because we had not got the plant to do the work that we did not get it. Mr. Gow is very favourably disposed towards our engines.

208. Coming to the drivers, in your experience what training do you think a man should have in order to drive an oil-engine?—Preferably, a man should have shop-experience of some years—very preferably, because it is better to have the engine in the hands of a man who knows how to build it and put it together. Otherwise, it is simply a matter of showing the man how to work it, and a certain amount of experience.

209. How should that be estimated?—Probably it might be estimated by examination.

210. Who should conduct that examination? Should it be, say, Mr. Glasgow, the Under-Secretary of the Marine Department, or any of the present Inspectors?—Of course, I do not know what Mr. Glasgow's qualifications are as a mechanical man.

211. We will assume that Mr. Glasgow has not any more knowledge of mechanics than myself or probably some other member of the Committee?—In that case it must necessarily fall to some one who has a knowledge of mechanics.

212. From your knowledge, have the Marine Inspectors, such as Mr. Duncan and his assistants, the necessary knowledge?—From all mechanical points I should say, yes, decidedly. Mr. Duncan knows I have no animosity towards him. The whole crux of the difficulty is in the manipulation of the oil-engine, which is so totally different to the running of a steam-engine that, unless one has had very considerable experience in the running of it, it is very difficult. There is a difficulty, even with a thoroughly-qualified man, in dealing with it.

213. We have got down probably to the crux of the whole thing—namely, whether the present Examiners or some other Examiners should be appointed?—I have no hesitation in saying that if I could have a few minutes' chat with Mr. Duncan he would be quite able to deal with the question. No matter how excellent a man may be, unless he has had experience with oil-engines, a little tuition would be necessary. It is not that I have any feeling towards Mr. Duncan, because, as far as I am personally concerned, nothing would give me greater pleasure than to assist him or any one the Government chose to appoint, either in formulating the examination or giving information, providing it was not used against myself. At the present time I have been made the managing director and engineer of a small company, established for the purpose of building gas- and oil-engines in Auckland, and we have sent Home for the tools for this special work. That is why I made the remark that I would give every information so long as it was not used against myself.

214. Did you design or assist in building any of this class of engine in the Old Country?—Yes.

215. So that, in addition to your theoretical knowledge before you came to New Zealand, you had practical experience?—Yes. For the last fifteen years I have been constantly building engines and also for experimental purposes of my own.

216. Coming back to the drivers, you say you think they should have some shop-experience?—I say very preferably so. I do not think it is absolutely necessary, because you can very often find men who are quite as handy in taking up a pair of brasses, or looking after a pump, without having had this experience, but I say very preferably the man who has served in a shop is better. We find that some men who have five years in a shop are not worth so much as some who have only had a year's experience.

217. Supposing you were an Examiner, and you found a driver who had had some knowledge of tools and shop-experience, do you think he would require to have a special knowledge of these engines before you would give him charge of a sea-going vessel having an oil-engine on board?—He would have to satisfy me that he could run the engine satisfactorily, and further than that, for examination purposes parts of the engine should be purposely made wrong, so that you could say to him, "Tell me what is wrong with the engine at once." There are many trivial matters about an engine, and if he could put these things right, you would know that he would not be likely to be stuck up with anything of a trivial nature at sea. So far as an explosion is concerned, that is almost impossible. We have no boiler, and the oil-engine and gas-engine are practically one and the same thing. I believe there are four hundred gas-engines in Auckland, and any one can run them without any examination at all, if he has got into the run of things. With small-power engines it is not necessary there should be any restriction, but with the larger vessels it is only right there should be an examination, but I think the examination should be made in accordance with the laws governing these matters. There is a natural law which governs these engines that cannot be departed from. There is the law which governs the explosive power of gas, which must be mixed with a certain quantity of air. If you take a charge of four parts to one of gas, the mixture is practically explosive, but with two parts to one it will not explode at all. It is not like steam, you cannot get above a certain pressure. There is a definite range in the explosive power of gas up to which you can work your engine. The best mixture is about ten parts of air to one of gas; so you see there is a natural law which you cannot get away from, and which practically disposes of the idea of explosion. That is a very strong point in the favour of oil-engines generally. I had the pleasure of showing Mr. Hall-Jones, the Minister of Marine, that by giving the engine too much gas it simply stopped. If you take too little gas the engine also stops, and that is a natural safety-valve which makes these engines particularly safe.

218. You heard the answer Mr. Duncan gave in reference to the danger by explosion on