

198. At work on the locomotives?—Yes.

199. Can you describe the appliances you had in 1896?—Yes, I have a diagram to show them. There is a brick arch, and a baffle-plate which deflects everything under the arch, and therefore there is a more perfect combustion. All the gases have to pass through the opening between the baffle-plate and the brick arch, and also through the tubes, which are about 120 in number. They then go into the smoke-box and are dashed against the door and up the chimney, where they meet with the deflector. They are then thrown down into the side portion. Since then there has been an improved arrangement, which brings the ashes down into the smoke-box again. The ashes eventually find their way into the atmosphere, and anything heavy will drop back into the outer casing. With the soft-coal appliances attempts have been made by the department to keep down the exhaust. We have tried to soften it by keeping the blast-pipe as large as possible, and by introducing petticoat-pipes which are moved up and down according to the requirements of the engine. This improvement, which is called an ash-shoot, is a late improvement.

200. It is the latest improvement in operation, is it not?—Yes.

201. Can you say whether those appliances are the present best known appliances for spark-arresting on locomotives?—Yes, to the best of my belief.

202. I think you take in and study the leading up-to-date papers on locomotive engineering?—Yes. We all have them through the colony. I may say the engines have also a steel band on top of the funnel, which is brought down as far as possible without stopping the engine from steaming.

203. With the exception of this ash-shoot, which has been an experiment since, that was the system in use in December, 1896?—Yes.

204. From your knowledge of engineering, and from the inquiries you have made, can you suggest any further improvement at the present time?—No, not at present.

205. You heard it suggested this morning by Mr. McLaughlin that you should put a gauze spark-catcher over the top of the funnel?—That is not possible.

206. Why not?—It would simply stop the steaming of the engine, and it would not last. Attempts have been made with gauze. Experiments have been tried with various kinds of it, and they have not succeeded.

207. So far as you are aware, is there any system yet invented which would act as a complete and perfect spark-arrester?—No.

208. Is it not known to science?—No.

209. You can only minimise the escape of sparks?—Yes. I may say that I belong to the Royal Master Mechanics' Association of America and to the Institution of Civil Engineers of England. I was at one time a member of the Institution of Mechanical Engineers, England.

210. This question of spark-arresters is a question that is still occupying attention?—Yes. We closely watch any proceedings in that respect.

211. The statute permits you to burn certain classes of coal on the locomotives: there are three or four classes allowed? You do not burn anthracite, do you?—No.

212. Bituminous coal?—No.

213. Brown coal?—Yes.

214. And you do not burn wood or coke?—No.

215. You burn brown coal only?—Yes.

216. Where do you get it?—Taupiri coal, at Huntly.

217. Can you speak to the effect of the coal producing sparks? We have had a suggestion that Newcastle or Westport would be better to burn on this section. Can you speak to the respective values of the two classes?—As regards consumption?

218. Yes, and as regards spark-throwing?—We have been trying some hard coal, but the experiments have hardly extended long enough to enable me to speak definitely as to results, because we do not know how much to put down to the coal or to the fact of the dangerous parts of the country having already been burnt off. We use mostly soft coal.

219. Do you find that there would be any less danger of sparks being thrown with hard coal than with soft coal?—Possibly there might be less danger.

220. You cannot speak definitely?—No, not yet.

221. Are your locomotives fitted with appliances for burning hard coal?—No. We have been using the hard coal with the soft-coal appliances. That would be less liable to cause sparks, though from our point of view it would be harder on the engine. If we were burning all hard coal we would not put in so much apparatus in the smoke-box and chimney. We would burn more hard coal by using soft-coal appliances.

222. What is the relative cost of burning soft and hard coal?—In the experiments we were making I reckoned we were burning 14 lb. of soft coal per mile more than hard coal, and the cost to us of the hard coal would be quite 2d. per mile. In other words, taking last year's running, it would cost £2,000 a year more to use hard coal than it would to use soft coal.

223. On the Auckland Section?—Yes.

224. There is no hard coal obtainable in this district?—No. It is all seaborne. We pay £1 7s. a ton, but by contract it might be got for £1, as against 5s. 5d. which we now pay for the soft coal.

225. If you used hard coal you would have to import it?—Yes.

226. Either from Westport or from Australia?—Yes. We burned three thousand pounds' worth of soft coal last year—that is, up to the 31st March, 1899.

227. And to do the same working with hard coal it would cost you £5,000?—Yes.

228. That would be £2,000 a year extra?—Yes.

229. On this question of spark-arresting apparatus have you any suggestions to make?—Not yet; but experiments are continually being made in the winter season.