

TUESDAY, 29TH OCTOBER, 1912.

The Committee met at 10.30 a.m.

THOMAS MAXWELL MILLIGAN examined. (No. 7.)

1. *The Chairman.*] What is your name?—Thomas Maxwell Milligan.

2. What is your occupation?—Engine-driver, sir.

3. What is your address, chiefly?—Care of the Kelburne Tramway Company. I do not wish to take up the time of the Committee in any way, but, being a resident for over fourteen years in the centre of the iron industry in Scotland, and being employed on the railways, I naturally had a good insight into the very difficult process of the manufacture of pig iron. The present proposals before the Government seem to be rather vague; in fact, the criticisms that have been offered by several of the members of the Lower House and through the public Press seem to show that they have no idea of the intricate business of the manufacture of pig iron. In giving this evidence before the Committee I have had a close acquaintance with all the blast-furnace works in Scotland. There are some sixty-two furnaces in blast now, and there has been no extension in the blast-furnace industry in Scotland during these last fifty years. One or two of the works lapsed, but have revived during the last ten or twelve years, and these blast furnaces were initiated over a century ago, I suppose, for the purpose of using up the large deposits of ironstone that was found in the coal-mining districts of Scotland. With regard to ironstone, this ironstone is almost all used up now. It had to be charred generally when got out of the mines, and then conveyed to the blast furnace. Owing to this ironstone being almost used up now they have adopted the system of using ores, and none of those ores are found in Scotland. There is a great lot of it comes from England, but the bulk of it comes from Bilbao, in Spain. They also require a very good supply of limestone for the manufacture of pig iron. Now, I do not think the limestone found in New Zealand may be suitable, but possibly it might do; but it is very essential to have good limestone for the manufacture of pig iron, and also there are other ores required for the manufacture of pig iron. Sulphur-ore is used for the furnace, and allows the iron to work down to the bottom, and without that the iron is apt to stick to the sides of the furnace, and consequently it is very serious if she slips at any time. Then there is a by-product that is got from the puddling-furnace, where they manufacture the malleable iron, in the shape of puddler's tap. There is no iron in this: it is simply used for the furnace cast. By the mixing of ores they have been able to bring out a good product of iron. There are several ores used, but I could not mention them all in the meantime. I have asked for some information from a friend in Scotland who is in one of the blast-furnace companies: I have asked him to give me some statistics, and if I get these out from Scotland I will forward them to the Minister of Public Works. Now, this ore is chiefly conveyed from Bilbao, in Spain, by colliers going over to Britain for coal, and it comes over in the shape of ballast, and it does not cost the manufacturers of iron very much to get it landed in Britain. Then, these iron companies have very special facilities with the railway companies to transmit it to the works at very cheap rates of freight, and by this means they have been able to produce iron cheaper than anywhere else. Of late years they have had very keen competition from the Americans. Ten years ago I have seen American pig iron imported into Britain, simply because the Americans put up furnaces with a very powerful blast plant. On this account a furnace is able to produce iron, but of not so good a quality as the English. All furnaces I know in Britain work on the hot-blast system; without the hot blast it would be almost impossible to manufacture iron here at a payable price, because this hot blast accumulates in the furnace; as the gases rise to the top they are conveyed through very large tubes to refineries where the different products are extracted. The refuse is then sent back into heaters, where it is burned to supply the hot blast for the furnace. All companies making pig iron have adopted this process. I might refer to what these heaters are for. In mentioning the hot blast, now—a blast furnace on the hot blast—it will be observed, with the great heat inside the furnace certain gases are formed: these rise to the top where the furnace is charged; large tubes lead from the top of the furnace to convey these gases away, and these are treated so as to extract the different by-products that are in them—tar, ammonia, and some other products. Some companies have different plants for this purpose and therefore extract more than others. Now, the refuse of these gases is sent back through tubes into these heaters and there burned, and this is where the hot blast is got to blow the furnace. A blowing-engine forces it through twyers into the furnace; sometimes as many as ten twyers blowing—the more blast the more iron-ore and coal is consumed. A furnace used in this way is able to cast about 40 tons a day. Now, that furnace casting about 40 tons a day costs a lot of money to build. It may not be very well known by the gentlemen forming the Committee how these furnaces are constructed. They are generally built on the face of a hill, so as not to give too steep a grade to get the outlet, and they are generally built half-and-half, and have to have an engine to lift the ore up to the furnace, and also an engine to take your pig iron away. I am an opponent of the present proposals, for this reason: If the Government commits itself to these proposals, you will notice they have offered to put out 65,000 tons a year before the proposed syndicate can claim a subsidy. It is impossible to keep a furnace blowing all the year round. Putting out an average of about 40 tons a day this would take at the least six furnaces in blast. They are very costly with regard to construction, and the different machinery that is attached to them now, and to bring them up to date would cost a lot of money. The construction of blast furnaces is that they are generally constructed and built of sandstone on the outside, lined with furnace-blocks on the inside, and these blocks are made from the best fireclay. I do not think there is any fireclay in New Zealand suitable that would stand the heat that is required. Generally the furnaces are about 70 ft. or 80 ft. high. Then heaters are built a similar height. With the proposal as it stands now, it is said