

finding a market for the products that the lumbermen are unable to sell.

On the technical end we were very careful to cut with reference to a future crop. We found a market for everything produced, and I think the forest has been left in as good shape as is possible in view of the timber being taken off. Utilization has been carried to the finest point, practically everything, even down to the charcoal wood, being cleaned up. We have revived the charcoal industry, and are burning charcoal on old hearths that were abandoned so long ago that six to eight-inch trees are growing up through the centre of them. The question of forest utilization is closely allied with the water supply problem. Therefore, we have had to modify some of the cutting in reference to the water-supply end of the question.

In planting and nursery work, the policy is to plant about a million trees a year. We do not always reach that, and I am not sure that it is advisable. It is a question as to how extensively a corporation should engage in forest planting. This is not what I would be expected to say, perhaps, but I believe that for most Eastern railroads the purchase and long-time management of timber lands is more profitable than planting. Forest planting, from a general standpoint, is very important. The road is trying to teach the farmers to plant waste lands, and also how to handle their wood lots. This coming spring seedlings are to be offered from the company's nursery at practically cost price. How great the demand will be I do not know, for there has not been very much enthusiasm about forest planting because there has been so much second-growth forest land.

Another point is that of fire protection. On the properties which are being logged and planted we have done the usual things in the way of fire protection, with which you are familiar. General instructions have been issued to all trainmen with regard to fire. Recently these instructions were summarized and distributed in booklet and placard form to employees, and also to the farmers along the line. I think the people are pretty well aware that fires are something we do not want.

As to preservative treatment of timber against decay, I think that is more important than planting; I do not know that it is more important than lumbering. It means a good deal in a hardwood country like Pennsylvania, because we have non-durable woods, such as beech, birch and maple, which are now being converted into ties. When these woods are treated with creosote they give better life than the durable and more expensive species, such as white oak, which are used untreated. The railroad treats the equivalent of a million and a half ties a year. By treatment these million and a half ties will last three times as long as they otherwise would, and practically cut down the drain on our local forests to that extent. The railroads, however, are not in the treating business for the purpose of saving the forests, but to save money. Still, wood preservation, in my opinion, is an important factor in the line of forest conservation.

All these specific things the Pennsylvania Railroad and other railroads are doing; but, with the exception of the Lackawana Railroad, so far as I know, they are not tackling the main problem, which is that of timber supply. The railroads are increasing their consumption of timber every year, but they are not doing a thing to provide for their demands ten or fifteen years hence. The Lackawana Railroad is the one exception, and it has bought land in the South with a view to providing a supply for both the present and the future.

Why have not the railroads and other large wood-consuming corporations taken this matter up? It certainly seems that the only logical solution of their coming wood problems is to have their own source of supply. The

planting of trees will not of itself meet the problems for each corporation. We could plant ten million trees a year, but that would not save the day, because the trees would not mature in time. And, what is more important, it will cost more to buy open or cut-over lands locally and plant them than to go into the South and buy mature timber. That can be proven by figures.

It seems to me that the logical thing, the step that will make forestry permanent, is for the consumer to get into the timber-producing business. But this has not been done. It seems to me that one reason for the present doing-nothing policy is that the higher officials, the men who really run the railroads and control the finances, are enthusiasts along other lines than that of wood-production. They do not see why they cannot buy ties just as they buy rubber bands. They have been told that difficulties would come, but an idea like that does not sink deep into minds which have developed with other ideas. Other interests, other problems, other policies command attention, and it is a hard job to make these people see that they are going to find they will be in difficulties for wood. Yellow pine ties have increased in price at the rate of three cents per tie per annum, but that does not necessarily mean anything to a purchasing agent, general manager, or president. The fact that tie renewals will cost a few hundred thousand dollars more a year is not overshadowing in importance; it will simply be made upon something else. But this problem may come with a rush. I hope it does, because I believe it will be the greatest thing for forestry that ever happened. The steel tie may come, but that is really not part of the problem.

I merely wish to call your attention to the big wood supply problem that the railroads are facing. They are doing their share along the ordinary lines of fire protection, planting, wood preservation, etc., but the other things, the big problems of wood supply for the consumers of the future, remain unsolved.

THE CASTING OF A LARGE BED-PLATE.

The Mesta Machine Company, Pittsburg (U.S.A.), recently cast an engine bed, the net weight of which was 120 tons. The casting is one of the bed-plates for an engine that is being built by the Mesta Machine Company, and which will be installed by the Youngstown Sheet and Tube Company, Youngstown, for operating its blooming mill. As 130 tons of metal were required to pour the mould, the iron was tapped simultaneously from five air furnaces, each furnace having been charged with iron of the same average analysis. The melting of the metal was so regulated that all of the furnaces were ready to tap at approximately the same time. The metal was tapped into six ladles, four of which were poured at one time, and, after these were emptied, the contents of the remaining two ladles were poured into the mould. Binders were placed across the mould throughout its entire length, and these were held in position by rods extending through the bottom plate. Bottom-pouring ladles were used, such as are generally employed for casting steel. This large mould was poured in an exceedingly short period, as only 17 minutes elapsed from the time when the metal was tapped into the ladles until the mould was filled. The casting was allowed to cool slowly in the sand for a period of 16 days. The removal of this casting from the pit presented an interesting problem, owing to its great weight, which, including the cores, must have approximated more than 200 tons. The sand was first removed from around the sides of the casting, and each end was gradually raised until the entire casting was clear of the pit. This permitted the removal of the cores and facilitated the subsequent handling of the bed-plate.