

in the localities where transporting facilities are absent) with a problem that can only be worked out satisfactorily by experiments. In the first thinning of larch or pines much of the removed timber will consist of small decayed props and slash; but this effects the desired clearance for future remunerative cuttings. In districts where firewood is a scarce commodity, or where railway communication is in close proximity, there is no reason why a small portable sawing plant cannot be worked on profitable lines and suitable "sticks" sawn into blocks for fuel or temporary pit-props.

Creosoting Sheep-stakes, &c.

In Scotland the durability of fencing-stakes, pit-props, &c., is enhanced by creosoting, and many estate-owners have constructed small creosoting plants, measuring approximately 20 ft. by 3 ft. 9 in. by 4 ft., the cost of which ranges between £60 and £90. Sheep-stakes can be treated for about 1d. each, but railway-sleepers require from three to four times the quantity of creosote. Briefly, at Murthly Estate the timber is stacked in the boiler and creosote poured in until all timber is covered. A well-arranged furnace quickly brings the liquor to a boiling-point, and the timber is allowed to remain in the creosote for forty-eight hours. Although thorough impregnation is not effected by the treatment, the years' experience gained shows that it is quite sufficient to greatly prolong the usefulness of the timber containing little heartwood. A Scots pine or larch railway-sleeper absorbs about a gallon of creosote. A small inexpensive experiment on similar lines to the above could, I believe, be undertaken with good prospects.

Distillation-works.

Another interesting form of utilizing unmarketable cord-wood and small waste timber was witnessed at the Forest of Dean, England, where a large distillation-works has been lately introduced. From Mr. Robinson, Chief Forester, and the Chemist in charge the following information was obtained, and was printed as an appendix to the recently issued report :—

WOOD-DISTILLATION.

"Wood-distillation Works, Forest of Dean."

"These works have been erected with the object of utilizing the considerable quantities of almost unmarketable cord-wood and small branch-wood which are left over when the broad-leaved areas in Dean Forest and the adjoining woodlands are felled. The works were opened in October, 1913.

"The total capital cost has not yet been adjusted, but was approximately as follows: Buildings, £8,000; machinery, £6,500; fittings, architect's commission, fencing, &c., £1,000: total, £15,500.

"The patent process of Herr F. H. Meyer, of Hanover-Hainholz, was adopted, after inquiry, as the most suitable, and the machinery was designed and supplied by his firm, the engine, boiler, and principal non-patented apparatus being of English manufacture. The buildings were erected from Herr Meyer's plans by Mr. E. Maples Linton, architect, of Newport, Mon.

"The works are designed to produce charcoal, wood-tar, wood-alcohol, and grey acetate of lime, which is used in the manufacture of acetone. It is not intended at present to manufacture acetone, but the works have been designed for installing the additional machinery necessary for that purpose, if required.

"The contractor estimated that the following products would be obtained from the plant by carbonizing 420,000 cubic feet of wood per annum: Grey acetone of lime, 384 tons; tar, 270 tons; charcoal, 1,380 tons; wood-spirit, 90 tons (equal to 23,400 gallons of 8·61 lb. each). As production commenced only a few months ago, sufficient time has not yet elapsed for the purpose of enabling the results and estimates to be fully compared, but the experience already gained leads to the conclusion that the above output will scarcely be obtained.

"Most of the wood used is oak, which is brought in by hauliers from the Crown forests, in the centre of which the works are situated, and is stored in large stacks, a stock of 1,500 to 2,000 cords being kept at the works.

"*The Process.*—The retort for the carbonization of the wood is built of iron plate, and is about 56 ft. in length and 7½ ft. in diameter. It is fired from a furnace on the left side, and is set in flues which enable the wood to be carbonized effectually. The wood is packed into cylindrical-shaped trucks, each holding about 2 cords, or 256 cubic feet, stacked, and five trucks form one charge for the retort. When ready the iron door of the retort is lifted and the trucks of wood are drawn in by an electric motor. The door is then securely closed and the temperature raised to between 330° and 350° C. Distillation usually commences in about two hours, and continues for twenty to twenty-two hours.

"After the process is completed the door at the other end of the retort is raised, and the trucks, which now contain charcoal, are quickly drawn by motor and run into an iron cooling-chamber similar in form to the retort. The doors at each end of the cooling-chamber are made secure and the exterior is irrigated with water to expedite cooling. From the cooler the trucks of charcoal are removed on the following day to the charcoal-shed, where they are emptied and the charcoal filled into bags ready for despatch.

"During the process of distillation about 70 per cent. of the weight of the wood is given off in the form of gases, which pass out of the top of the retort through two copper pipes into a tar-separator, where the tar is condensed and flows into a tank. The tar is then run into a *montejus* and lifted by a compressor into the tar-still, where it is freed from the acid, oils, and water remaining in it. It is run direct from the still into casks, and is then ready for marketing.

"The gases and vapours, freed from tar, pass out at the top of the separator and on into a tubular condenser, where the naphtha and acid vapours are condensed and run into large