or one-fourth as much as a by-product oven, which explains the popularity of the bee-hive ovens. The quality of coal for coking in Europe is not so good as on this continent, and requires the by-product oven in order to make the greatest quantity and best grade of coke. Therefore the use of the more expensive by-product oven is not altogether a matter of choice in Europe.

Creosote oil is one of the fractions of crude coal-tar obtained by its distillation. It is the fraction coming off between the benzol and carbolic acid compounds, which come off at low temperatures, and the pitch, which remains in the still at the highest temperatures. Coal-gas tar usually has a high percentage of free carbon which should be filtered out, or otherwise removed, before such tar is ever mixed with creosote oil. Refined coal-tar is often added to the creosote oil in preparing it for use in wood preservation, as the treatment is more permanent when the mixture is used than when only creosote oils of low specific gravity are used, as there is a marked evaporation of the low-boiling fraction of the creosote oil. The coal-tar and the creosote oil, when mixed, combine thoroughly, and cannot be separated again, either physically or chemically.

Up to the present only wood block and ties have been treated at Trenton, but it is expected to treat timber for station and outdoor platforms; switch ties; dimension timbers; decking; flooring for docks, bridges, fire halls, warehouses and heavy manufacturing plants; crossing planks; fence posts; signal poles; snow fences; piling; mine props; telegraph and telephone poles; cross arms; mine timbers; tie plugs; wooden pipe; and all material for breakwater and marine work.

The first ties ever treated in eastern Canada from Canadian timber were creosoted at the Trenton plant last month for the Toronto, Hamilton and Buffalo Railway. The only woods used so far have been beech, birch and maple for ties, and southern yellow pine and Norway pine for wood block, but spruce, tamarack, fir, hemlock and other woods will probably be treated later on.

Special attention will be given to the treatment of mine props, as timbers for use in mines decay very readily, owing to ideal conditions of moisture and temperature for fungus growth. Much of the failure of mine props now attributed to breaking and splitting is due primarily to rot. This can be prevented, and the original strength of the timber maintained, by creosoting or otherwise preserving it. The creosoting of mine timbers is not so expensive as come other forms of creosoting, because it is not necessary to obtain such great penetration. The uniformity of temperature and moisture in mines, and the lack of exposure to the direct rays of the sun, result in no checking taking place, so that it is not necessary to get such deep penetration. A much lighter treatment than is given other timbers will therefore prove satisfactory. But this does not necessarily mean that any merely superficial treatment is sufficient.

The difference in strength between untreated and treated ties and timbers, except in the case of those treated with heavy oils which protect the timber from excessive moisture and add to its strength, is so slight as to be of no importance. This assumes that ties and timbers are properly treated and not injured by steaming or excessive heat during treatment. The drier that wood is kept, in ties and timbers, the stronger and better service they render.

The very great value derived from the treatment of wood is not only the prevention of the rot which makes the wood useless. The treatment maintains the original strength of the timber, especially in the case of ties treated with oil, and causes it to resist mechanical abrasion and wear longer. Furthermore, when ties are properly seasoned before treatment and preserved with creosote oil, the oil resists moisture and prevents the ties from becoming soft and spongy.

The added life due to creosoting depends upon the quality of treatment, and upon the kind of timber and the manner in which it is used. It is only fair to say, however, that creosoted ties will last from three to five times as long as untreated ties, while the cost of treatment does not double the cost of the tie. Therefore the great saving in the use of treated instead of untreated ties is apparent. This saving is even more pronounced in the case of other timbers.

NEW SAFETY AND DETONATING FUSE.

In a paper presented at the Pittsburg meeting in October of the American Institute of Mining Engineers, Mr. Harrison Souder, of Cornwall, Pa., directs attention to a safety detonating fuse by the use of which he claims misfires in blasting may be eliminated and safety in blasting operations provided. The detonator, which is known as the Cordeau detonant, is sold under the name of Cordeau-Bickford, and consists of a lead tube 5 to 6 mm. in diameter, filled with trinitrotoluene. It is applicable to all classes of mining, but is of especial value in connection with deep-hole blasting in open-cut mine or quarries, or any operations where a large number of holes are to be shot at one time. After detailing the superior results obtained with the use of this fuse in actual practice, the author summarizes its peculiar advantages as follows:

(1) There is no danger in handling or storage of the fuse. It cannot be exploded by friction, fire, or ordinary shock. It requires the use of a strong blasting cap properly attached to explode it. In blasting charged holes, the cap or exploder can be applied outside the hole, thus avoiding the danger of burned powder caused by side spit from ordinary fuse; also any risk of accident while tamping and the risk from a portion of an unexploded charge accompanied by a cap remaining in the debris from a blast is entirely obviated.

(2) The average rate of speed of this fuse is estimated to be close to 17,000 feet per second, so that when it is used, the explosion charge is detonated instantly throughout its entire length, instead of at one point as is the case with the blasting cap or electric exploder.

(3) It is known that the speed of an explosive decreases as the explosion wave travels away from the detonator. That the powder in a hole has the strongest explosive effect around the exploder is evident from an examination of the face of the bank after a shot. This can be demonstrated also by placing sticks of dynamite on the ground end for end, about 6 inches apart, with the cap in the first stick. The explosive force gradually lessens until it finally ceases to progress, leaving the farthest stick unexploded.

By using this fuse, the charge is detonated instantaneously throughout its entire length. This results in a saving of about 10 per cent. of explosives as determined by results obtained at Cornwall and elsewhere. It is not affected by heat, cold, or moisture, and lasts indefinitely without deterioration.

It is wound in continuous lengths on spools containing 100, 200, or 300 feet each, and weighs about 7 pounds per 100 feet. It is accepted by transportation companies without restrictions except that it shall not be packed with other high explosives.