

## BY-PRODUCTS OF COAL.

IN the exhibit of the Barrett Manufacturing Company at the San Francisco Exposition an enormous block of soft coal is shown surrounded by its innumerable children. The first generation consists of ammonia, illuminating gas, crude benzol, coal tar and coke. The crude ammonia is the parent of household ammonia and of the anhydrous ammonia used in producing artificial ice. Then there is ammonium chloride, an important element in electric batteries. Ammonium nitrate is used in the production of high explosives. Ammonium bicarbonate is valuable in the modern baking of food, and most important of all is ammonium sulphate, a powerful soil-nitrifying agent. Plants of various kinds are shown that have been grown with and without the ammonium sulphate under identical conditions, exhibiting a striking difference in the strength of the crops. Illuminating gas burns up in a blaze of light and leaves no heirs.

From crude benzol come the beautiful aniline dyes. It is also of great importance in the manufacture of automobile tires and in the production of artificial leather. Then there is toluol, a basis for modern high explosives and now much in demand.

Coal tar produces Tarvia, a bituminous binder for building automobile-proof roads, Barrett specification roofs, consisting of tarred felt and pitch, and a long list of the ready-roofings for barns, felt and building papers for walls, and waterproofing felts, which are used with pitch for the lining of excavations, basements and tunnels to exclude dampness of the soil. Then there is paving pitch used in the joints of block pavements for city streets. Creosote oil which can be impregnated into wood thereby makes it proof against decay and gives us wood block street pavements, durable piling and long-lived fence posts and mine timbers. Creosote alone is worth \$25,000,000 a year to the country in its ability to prolong the life of fence posts.

In addition, coal tar is the parent of innumerable chemical and medical products, especially phenol or carbolic acid, an indispensable medical disinfectant with innumerable industrial uses, including the process of manufacturing phonograph records.

Naphthalene, or coal tar camphor, is useful in keeping moths out of clothing.

Among the by-products in the carbolic branch are picric acid, a high explosive, and a long list of bactericides and disinfectants, including Pyxol, twenty times as powerful as carbolic acid and death to germs of all kinds, yet perfectly harmless to animal life.

Coke is useful as fuel and has special value in the steel industry.

All told, coal has the largest variety of derivatives of any mineral. The Barrett Company's exhibit shows many of the processes and has been well planned. It is in the Palace of Mines and Metallurgy.

In a recent interview, Brig.-Gen. Bertram, chairman of the Canadian Shell Committee, is quoted as stating that shell contracts for the Imperial Government so far awarded in Canada amount to over \$154,000,000.

The Jeffrey Manufacturing Company, Columbus, O., announce the removal of their New York branch from 99 Warren Street to 50 Dey Street, adjoining the Hudson Terminal. Mr. Geo. H. Mueller is the manager in charge of the office.

## COST OF TREE PLANTING, QUEEN VICTORIA NIAGARA FALLS PARK.

In the report for 1913 of Mr. John H. Jackson, superintendent of the Queen Victoria Niagara Falls Park, it is stated that in connection with the planting operations an experiment was started on the sections of stiff clay where the ordinary methods were likely to prove unsuccessful, the soil being so impervious as to prevent drainage, proper aeration, and the ramification of roots. Holes dug with the spade were useless and dynamiting was, therefore, resorted to, the 40 per cent. grade being used. Fissures for drainage and aeration were thus opened, and the soil shattered, although not actually ejected. The data relative to the foregoing experiment will, when published, be interesting and instructive. For tree planting purposes considerable quantities of soil were filled into the dynamited holes to afford a rooting medium until the surrounding area will through cultivation and aeration be brought into a fertile condition. The approximate cost of constructional operations and items are as follows:

Filling, grading, harrowing and seeding during the year 1913 .....	\$14,000.00
Four miles were completed, the cost per mile being .....	3,500.00
Planting, staking, mulching and pruning trees .....	3,000.00
Trees (2,000 planted) .....	1,000.00
Average cost of established tree .....	2.00
Initial cost of each tree .....	50
Four miles of boulevard were planted, the average cost of ornamentation per mile being \$4,500, or a total for four miles of .....	18,000.00

For the year 1913 the cost of maintenance of the sections ornamented in previous years amounted to \$1,800. This, however, must not be used as a criterion of the cost of subsequent years as with the completion of the work of ornamentation in sight, the expenditure will decrease on capital account, and increase on maintenance, for as the trees, shrubs and lawns approach maturity they must be properly cared for, otherwise dilapidation will ensue.

## EXPLOSION-PROOF MOTORS FOR MINING WORK.

Among its investigations dealing with the means of lessening such dangers as attend the use of electricity in the mining industries, the U.S. Bureau of Mines has undertaken one that has for its purpose the establishment of permissible explosion-proof motors for use in places where an electric spark or flash might ignite inflammable gases or dusts. Technical Paper 101, "Permissible Explosion-Proof Electric Motors for Mines; Conditions and Requirements for Test and Approval," which has just been issued, mentions the details of construction that the bureau considers essential for satisfactory service and describes tests of an explosion-proof mining-machine motor and accessories approved by the bureau. The author of this paper is H. H. Clark, electrical engineer.

The bureau has applied the term "Explosion-proof" to motors constructed so as to prevent the ignition of gas surrounding the motor by any sparks, flashes, or explosions of gas or of gas and coal dust that may occur within the motor casing.