A COAL TESTING PLANT FOR THE SASKATCHEWAN GOVERNMENT.

A plant is about to be erected by the Saskatchewan government at Estevan for the purpose of developing and testing the lignite coal of that district. The plant will be in charge of Mr. S. M. Darling. The following short account of what he has accomplished with North Dakota lignite is especially interesting to us in view of the fact that the lignites of Southern Saskatchewan and of North Dakota are of the same cretaceous character.

The chemical composition of these lignites precludes their being successfully briquetted in their natural condition. To market the lignite commercially in a large way it must be destructively distilled, carbonized or partially carbonized, and the resulting gas, oil or tar, ammoniacal liquor and carbon residue utilized separately.

Analysis of a large number of samples of North Dakota lignite averaged on a dry basis; volatile matter 40.67, fixed carbon 53.33, ash (practically no sulphur) 6.00.

On carbonization, the products in round numbers are:—

1. Gas, per ton of lignite ..... 10,000 cubic feet.
2. Oil or tar per ton ..... 20 gallons.
3. Ammoniacal liquor ..... 35 gallons.
4. Carbon residue ..... 1,200 pounds.

The yields of gas and oil depends largely upon the temperature and rate of carbonization. With a high temperature and quick carbonization the yields of gas will be high and of oil low; while with a lower temperature, and longer time in which to carbonize. there will be less gas and more oil.

The gas has a heating value of 450 British thermal units per cubic foot. It contains a good percentage of illuminants, but has about fifteen per cent. of carbon dioxide, which almost entirely destroys the illuminating power. This carbon dioxide can be removed by passing the gas through lime, but the process is too expensive for commercial application. The gas can be used as an illuminant by burning it in a mantle, but it is serviceable principally for fuel and power.

There is more gas in one ton of lignite than is required to carbonize the next ton. In practice only sufficient gas is removed to supply the requisite fuel to carry on the process. The remaining portion of the volatile is left to add heating value to the carbon residue.

There is therefore no charge for fuel in the process.

On distillation the oil yields:—

Light oils, benzine, toluene, etc.	11.5 per cent.
Carbolic, oils, some naphthaline	11.5 per cent.
Creosote oils	36.1 per cent.
Anthracene, some paraffine	18.4 per cent.
Pitch, hard	22.4 per cent.

This oil or its distillates can be put to many uses—fuel oil, creosoting oil, leather preservative, waterproofing, pitch, etc. Upon exhaustive distillation it yields aniline dyes, carbolic acid, and in varying proportions all the other coal tar products.

The ammoniacal liquor yields some acetate of lime, or if desired, acetic acid, and about 15 pounds of sulphate of ammonia per ton of lignite. There is a growing market for all of these materials, particularly the sulphate, as fertilizer.

The lignite crumbles on carbonization, which renders possible a continuous carbonizing process, obviating the laborious charging and drawing of retorts, as practised in coal gas plants.

The cretaceous lignites retain largely their original woody structure, and hence do not break up so finely during carbonization. After removing by means of screens the small percentage of fines after carbonization, there remains practically lump charcoal of one-half to two inches in size. This can be used in gas producers, under boilers, and for domestic purposes. This lump charcoal is of about the same analysis as anthracite and has about the same heating value, but is not so dense in structure and therefore has somewhat more bulk per ton than the anthracite.

The fines have to be briquetted, or still further pulverized and burned as powdered fuel, a practice which is rapidly gaining favor.

Actual briquetting and burning tests of this fuel in carload lots demonstrate that satisfactory briquettes can be made with not to exceed 2 per cent. of starch and 6 per cent. of coal tar or lignite pitch as binder.

The briquettes burn with a short flame, no odor, no smoke and no clinker. They can be used wherever anthracite or bituminous coal is burned. They retain their structure in the fire until completely burned. They do not disintegrate or lose value in the weather, and can therefore be shipped any distance without loss.

The lignite coke is an ideal gas producer fuel. A satisfactory gas producer generating gas for power purposes from fuels containing a large amount of volatile, as does the raw lignite, is not available. But with the volatile removed, this lignite coke, transformed into producer gas and used in a gas engine to generate electricity, effects an enormous saving over the present method of producing electricity by means of boilers and steam engines. The gas producer requires only about one-fourth the fuel necessary with boiler and engine to produce an equal amount of horse-power. This producer gas also is an exceptionally good fuel for burning brick, tile, etc.

The matter of a large central power plant at the mines to generate electricity for transmission over a wide radius is essentially one of the quantity of current that can be sold, distance that it must be transmitted and evenness of load. If the current must be transmitted a long distance to a large centre of population there must be intermediate towns at which substantial quantities can be sold. This is simply a question of population. Of course, with cheap power available manufactories and people. to use it will come rapidly But, while the time is near when such a central power plant will be the logical thing, heed must be given also to the large demand for solid fuel, for gas producers, boilers and domestic purposes. Any large installation, therefore, would have as products not only electrical current, but coke, briquettes, fuel oil and other by-products resulting from the carbonizing process.

To defray the cost of carbonizing and briquetting there is the revenue from the by-products, and it is known that the income from this source will at least meet that charge. But aside from this, there is to be derived from this carbonizing process the enormous benefit afforded by the possibility of mining and shipping lignite the year round because the product is put into a condition which prevents deterioration no matter how long the fuel is stored or how far it is shipped.

The Lancashire Dynamo and Motor Company, of Canada, Limited, have moved to new premises at 107 Duke Street, Toronto.

A French process of "electrocuting" timber is declared to give perfect seasoning in a single night. With lead plate electrodes. on each side the timber is placed in a solution containing 10 per cent. of borax, 5 per cent. of resin and a little soda, and application of the current expels the sap and fills the wood cells with the borax and the resin.