# MINING.

## NOTES ON THE REGION OF ETERNAL COAL.

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*Continued.*

Proceeding to the foothills of the Rocky Mountains in the order chosen, we next encounter the intermediate or lignitic coals of the Canadian Hinterland.

*Lignitics.*—These coals are said to be good fuels, and may be advantageously used for domestic, steam, metallurgical, and, in a lesser degree, for gas lighting purposes. On exposure to the air they fissure slightly, but do not disintegrate, thus betraying a greater disposition to resist exposure to the atmosphere than the coals of the more eastern belts of lignites. On the whole, they may be described as a firm fuel, standing mild screening and generally suited for transportation purposes, but it should be remembered that they still belong to the friable family of coals, and for this reason are more fit for driving stationary machines than for locomotive purposes.

The interesting structure of these coals is apparent from the following test samples:—

1. Lignitic coal from the Belly River; cretaceous. Structure very fine lamellar, lines of bedding not infrequently very indistinct or altogether obliterated; compact, contains an occasional interposed patch of mineral charcoal, and here and there a thin plate of gypsum; color black, in parts iridescent; lustre of surface along the plane of bedding dull, that of the cross fracture resinous, sometimes brilliant; fracture uneven and at times somewhat conchoidal; apart from the patches of mineral charcoal, does not soil the fingers; powder almost black, communicating a brownish-red color to a boiling solution of caustic potash; by exposure to the air fissures slightly, but remains, on the whole, a tolerably firm coal, resembling some varieties of the carboniferous coal in appearance. Specific gravity, 1.3976. Weight of one solid cubic foot. 87 35 lb. (For comparison, specific gravity of lignite from the North Saskatchewan river, 1.4256; weight of one solid cubic foot, 89.10 lb).

2. Lignitic coal from the famous Coal Bank seam, Belly River, near the ford by trail to Benton; 5ft. 6 in., cretaceous, base of Pierre. Structure very fine lamellar; the lines of bedding, which are very numerous and close together, are almost obliterated; compact. It contains interstratified more or less disconnected lenticular layers of dense pitchblack highly-lustrous coal, and an occasional patch of mineral charcoal, it is here and there intersected by thin plates of calcite, as also by an occasional film of pyrites; it also contains in parts a little reddish-brown translucent resin; colour, black; lustre, resinous; fracture uneven, occasionally more or less conchoidal; hard and firm. Apart from the patches of mineral charcoal, does not soil the fingers:—Powder black, with a faint brownish tinge; it communicates a brownish-red color to a boiling solution of caustic potash, resists exposure to the air. In appearance it closely resembles some varieties of coal of the carboniferous epoch. Specific gravity, 1·3587. Weight of 1 solid cubic foot, 84·92 lb.

As coking coal, these lignite fuels are decidedly unsatisfactory. The coke produced is slightly fritted and can scarcely be described as worth anything save for certain technical purposes, which, of course, necessarily restricts its application upon a liberal scale. Their coking characteristics have, however, been experimented upon in the laboratories of the Canadian Geological Survey—which, by the way, is one of the most comprehensive surveys of the time. As the lignite fuels of the territories appeared to be of such a non-caking character, it seemed desirable that definite data should be prepared which would determine exactly what proportion of true coals, intermixed with the fuels of the two eastern belts, would produce a coherent and serviceable coke. Accordingly, proportions of the well-known Youghiogheny gas and coking coal were procured from Pennsylvania and reduced with lignite and lignitic fuels to a state of mechanical division, such as a tolerably fine powder, care being taken to ensure a practically uniform weight of mixture in the several experiments, and coking was proceeded with as nearly as possible at an even rate of temperature, with the following results:—

| Proportions. | | | |
|---|---|---|---|
| Lignitic coals. | | Youghiogheny coal. | Character of coke. |
| 100 | ... | 20 | ...Firm, coherent, and excellent coke. |
| 100 | ... | 15 | ... Do. do. |
| 100 | ... | 10 | ...Firm, but rather inferior. |
| 100 | ... | 5 | ...Coherent, tender, and fairly good. |
| Lignite. | | Youghiogheny coal. | |
| 100 | ... | 20 | ...Firm, coherent, and of good quality. |
| 100 | ... | 15 | ...Coherent, rather tender, but fairly good. |
| 100 | ... | 10 | ...Coherent, tender, and inferior. |

These interesting experiments are, for the time being, more instructive to European lignitic coal producers than to Canadian. Whereas European lignites sustain valuable industries, Canadian do not, and, it may be added, will not do so for a very considerable time to come. From this point of view, then it is important to note that an addition of 15 parts of a strongly caking coal to 100 parts of Canadian lignitic coal ensures the production of a strong and good coke; with ten parts of caking coal the character of the coke is still good, and even with 5 parts less of caking coal a good, though rather tender coke, is obtained. Upon the other hand, lignite—which, as I have pointed out, is one stage further removed from true coal than the lignitic branch of the coal family—requires, of course, a much larger proportion of caking coal to yield equally satisfactory results. Twenty parts of caking coal and 100 parts of lignite can only produce a coke of the character which 10 parts of caking and 100 parts of lignitic fuel is here pronounced to yield; with 15 parts, or a reduction of one quarter per cent of caking coal, the coke was found tender, though perhaps still economically valuable as a