

On the Burke's Creek Company's lease the coal in this seam is unmarketable on account of the excessive sulphur content. This element appears in combination with iron as the unstable sulphide, marcasite, which decomposes rapidly on exposure to the atmosphere and generates heat, which promotes spontaneous combustion. During my sojourn in Reefton an adit was commenced in Burke's Creek. The outcrop coal was tipped, together with a fair proportion of stone, to form a tramway to connect the proposed mine with the main haulage-road. Within six weeks, however, the heat generated by the decomposition of the marcasite had ignited the coal. It is therefore obvious that the working of this seam would be a difficult problem. (Marcasite can be distinguished from iron-pyrites by its silvery colour, in contrast with the bronze colour of the pyrites.) The high sulphur content of No. 3 seam at Burke's Creek continues to the southern boundary of the coalfield.

The regularity of the seam is no less changeable than the character of the coal. It is impossible to predict the behaviour of this seam for more than a few chains from an outcrop. Stone bands are frequently encountered, but disappear as rapidly as they appear; sometimes there is only a few inches of coal above or below them. The only locality in which this seam is workable is on Morris's lease, where it is the most valuable coal in the district.

ANALYSES* OF AIR-DRIED SAMPLES OF COAL FROM NO. 3 SEAM.

Locality.	Fixed Carbon.	Volatile Hydro-carbons.	Water lost at 105-110° C.	Ash.	Sulphur Per-centage.	Colour of Ash.	Coking Properties.	Remarks.
Morrisvale No. 3 dip	44.79	40.27	12.14	2.80	2.86	Light brown ..	Pulverulent
Archer's Mine ..	41.10	44.73	7.24	6.93	3.67	Pink ..	Dense, weak
Burke's Creek ..	38.99	31.81	13.68	15.52	11.42	Brown ..	Frits somewhat	Contains much marcasite ("brass").

* Analyses by Dominion Analyst.

No. 4 Seam.—This seam is the thickest appearing on the field. It is separated from the greywacke basement rocks ("slates") by 20 ft. of mudstone as far north as Painkiller Creek, beyond which a band of coarse sandstone develops. Beneath the Waitahu Plateau, this sandstone merges into a great thickness of current-bedded sandstone, conglomerate, and grit, which replaces all seams but one.

The gently undulating surface of the greywackes which lie a few feet below No. 4 seam was decomposed by subaerial weathering before the deposition of the coal-measures. The unconformity provided a passage for the circulation of underground waters which cemented the mudstone below No. 4 seam, and formed an indurated rock resembling, at first glance, the decomposed product of the weathering of the surface of the greywackes. Consequently difficulty is sometimes experienced in locating the exact position of the unconformity. These facts should be kept in mind when prospecting for this seam: time has frequently been wasted in prospecting for coal beneath the indurated basal rocks of the coal-measures. This point is of more importance to those interested in the mines in the adjacent Murray Creek field than in the Reefton field.

The thickness of No. 4 seam reaches a maximum of 35 ft. on Archer's lease at Caplestone. In the old workings on Morris's lease, the total thickness is over 30 ft., but this includes several "dirt" bands. Between Madman's Creek and Reefton there are between 20 ft. and 30 ft. of coal. At the present time the seam is worked only in Burke's Creek, and at the corner of the Reefton Township. Old workings exist in many parts of the district, but were abandoned owing to the poor quality of the coal, which is very slow burning, and produces a large proportion of fine coal. The thickness of the seam, the ease with which it can be extracted, and the large quantity still available for working by rise methods justifies a thorough investigation into its uses.

It is thought locally that the seam should be more compact, and produce a smaller proportion of slack when mined farther from the outcrop than is at present the case. It is probable, however, that this quality will improve only slightly at depth, as the fineness of the product is brought about by the presence of innumerable thin bands of "soot." Moreover, such screened coal as is produced has the habit of comminuting in transport.

The best block of "rise" coal remaining in this seam lies beneath the hill between Burke's and Stony Batter Creeks. If a level were driven beneath this hill from either of the above-mentioned creeks, any improvement which may occur under deep cover would become apparent. If justified by the results obtained from such a drive, a long crosscut could be driven from the dip workings in No. 2 seam in Stony Batter Creek.

No. 4 seam underlies the plateau between Reefton and Reddale Valley. Some good coal is now being produced from Honey's Mine. A large block of land between Painkiller and Madman's Creeks is underlain by No. 4 seam. The block is intersected by two faults, the more southerly of which is not sufficiently profound to become a mining barrier in a seam with a thickness in the neighbourhood of 30 ft. North of the Inglewood fault this seam has a very thin cover, and is unmarketable.

An outcrop appears a few feet above the greywacke on the Waitahu River bed. The coal in this locality appears to be cleaner and harder than elsewhere, but no attempt has yet been made to exploit it. The seam extends beneath the Waitahu Plateau for an unknown distance before it is cut off by the washout. I feel justified in forecasting an extension for at least 8 chains.