Coal in that district was first discovered in Coal Creek, and after the two tunnels marked on the plan "Old Drive" and "Tunnel" respectively were constructed, Mr. C. Y. O'Connor, the then County Engineer, examined and reported upon the discovery. Copies of his report and plan and a number of geological specimens were forwarded to the General Government, and submitted to Dr. Hector for analysis and report. Since that time, prospecting for coal in Coal Creek has been abandoned, and I can therefore present no fresh data concerning the several seams cropping out near that creek. All the information regarding these will be found in Mr. C. Y. O'Connor's report dated 29th September, 1870, and Dr. Hector's report dated 13th December, 1870.

The first indications of coal (detached pieces imbedded in a yellow clay) in Purnell's Creek were found near peg No. 8, and an examination of the upper portion of the creek bed disclosed the existence of several seams running N.E. by N. The Prospecting Company then, for the purpose of thoroughly examining the same, cut a cross trench (A.B.) on the east side of the creek, which resulted in exposing to view eight coal seams, varying in thickness from 6 in. to 6 ft., the three largest being 4 ft., 4 ft. 6 in., and 6 ft. respectively (see section of Prospector's trench).

They next sank a shaft on the top seam (marked "upper shaft") to a depth of 44 ft., descending in the coal seam the whole depth, and proving satisfactorily thereby—what could not be fully ascertained by examination of strata in trench—that the seam descends vertically. Referring to the section of the "upper shaft" you will perceive that the thickness of the coal for the first 37 ft. varies from 4 ft. to 5 ft. 6 in., and that thereafter it increases to a thickness of 8 ft. 6 in. The underlying and covering strata (sandy clay and shale) is cut at east or west side alternately by the perpendicular sides of shaft, showing that, in addition to the upheaval or depression of the whole mass, the coal seams and surrounding strata have been exposed to a very considerable shaking.

The Company next sank the "lower shaft," a section of which is shown on the accompanying map. At the out-crop, the coal seam was found 6 ft. wide, and at a depth of 4 ft. from the surface, the wedge-end of a sandstone reef (?) was struck, which divided the coal seam in two parts, of a thickness of respectively 4 ft. 6 in. and 2 ft. 10 in. As they descended in sinking this shaft, the sandstone formation expanded, until at a depth of 11 ft. it reached a thickness of 2 ft. 6 in. The coal seam of the "lower shaft" has been traced to a considerable distance, and it measures in the bed of Purnell's Creek fully 7 ft. in width.

In Butcher's Creek also, a small seam of coal has been discovered at an elevation of about 1,167 feet above sea-level. It is only 3 inches in thickness, runs in the direction of S. ½ W., and dips towards the east at an angle of 70°.

These are the various seams known up to the present time in the Kanieri District, considering their position, strike, and dip, viz.:—

Seams near Coal Creek	...	Strike, N. by E.	...	Dip, 18° and 33° S.E.
Seams near Purnell's Creek	...	„ N.E. by N.	...	„ 90°, or vertical.
Seams near Butcher's Creek	...	„ N. ½ E.	...	„ 70° E.

and, considering the short distance from one batch of seams to the other,—namely, from Coal Creek seams to Purnell's Creek seams, 27 chains; from Purnell's Creek seams to Butcher's Creek seams, 16 chains,—it must be evident that very considerable local disturbances in that portion of the Kanieri coal measures must have taken place, and the correctness of Dr. Hector's opinion, as noted in his report of 13th December, 1870, that the coal appears to be "in a faulted or locally-dislocated portion of the formation," is fully borne out.

The underlay or floor of the coal seams exposed at Purnell's Creek being on the east side of said seams, proves that the upheaval has taken place from the east towards the west. The undisturbed coal bed should, therefore, be sought between the present workings and the Kanieri Lake, unless it is taken for granted that the eastern boundary of the coal measure is somewhere near Butcher's Creek. The wedge-shaped sandstone dividing the coal in "lower shaft" seems certainly to favour the latter idea; but unless it is proved, by sinking the "lower shaft" to a much greater depth, that the width of this sandstone formation continues to increase considerably, it may fairly be put down as one of those not unfrequent cases met with in known coal measures, where thin layers of such formation are found enclosed in coal seams of considerable thickness.

The Company, in the belief that the undisturbed coal bed is to be found to the west of the shafts, commenced boring in the bed of Purnell's Creek. They went to a depth of 95 feet, and during the entire depth passed through the same sandstone formation which showed at the surface, proving thereby that the strata from the bottom of the prospectors' trench to the bore (near peg No. 8, Purnell's Creek) are in a vertical position, like those about the shafts. It also seems to indicate that the coal seams descend to a very considerable depth—to about 280 feet (if they reach the level of the bottom of bore)—and if so, there is coal in abundance, provided the working of vertical seams of from 6½ feet to 8½ feet can be profitably carried on.

Highly inclined seams of coal (edge coal) are profitably worked elsewhere, and I think means might be devised for profitably working vertical seams of so great a thickness.* This however is a question for engineers to consider, and I shall therefore content myself with simply pointing out the facilities of approaching the coal seams at a great depth by way of a tunnel. Peg No. 8, near the bore in Purnell's Creek, is 160 feet lower than the mouth of the "upper shaft," and about 220 feet lower than the top of the hill. Provided the coal seam of the "lower shaft" continues in the same direction, and this can be easily ascertained by tracing the same on the surface, a tunnel run from peg No. 8, at a bearing of 118° magnetic, should intersect the vertical coal seams of the Prospectors' trench at a depth of at least 200 feet below the surface, that of the lower shaft at a distance of about 425 feet from the mouth of tunnel, and the seam of the upper shaft at about 510 feet. The latter seam, as already stated, reaches the width of 8½ feet, at a depth of 37 feet from the surface.

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* An unlimited supply of the most suitable timber for mining purposes, for props, &c., can be had on the spot. Pine trees of 3 feet diameter and above, abound in that locality.