

25. Patch of quartzose gravel, with iron pyrites resting on coal (thins to 3 feet against dip)	4	36. COAL and fire-clay	5
26. Carbonaceous clay	10	37. Fine pipeclay	4
27. Sandy clay, with pebbles interspersed ...	30	38. False roof of gravel stone	1
28. Conglomerate of slate pebbles, irregularly stratified	6	39. COAL (M) (Coal Mine seam)	18
29. Grit, coloured bright yellow, with efflorescence	12	40. Carbonaceous shale	3
30. Carbonaceous shale	6	41. Pipeclay	1
31. COAL	5	42. Gravel stone, with grit and stems of trees	60
32. Carbonaceous clay	15	43. COAL	2
33. Yellow and gray clay, with gravel beds and carbonaceous shale	15	44. Fire-clay	1
34. Grit and pebbly conglomerate	30	45. This rests on a conglomerate of green schist, pebbles, smooth and oval, of various sizes, to 6 inches in diameter, cemented by green and gray sand, containing magnetic iron sand and glauconite, which continues to the Spit. Bedding decided to E.S.E., 15 deg. This conglomerate is cut by veins of calc spar, a few lines in thickness, that pass N. and S. right through pebbles and cement.	
(A few chains are here obscured by a more recent formation than even the upper sands, consisting of sand and drifted wood passing into lignite.)			
35. Red clay	4		

There are, therefore, in the above distance, four seams of clean, workable coal exposed in the section, giving a total thickness of 38 feet; but in some cases the same seams are probably repeated by faults.

The coal seams are apparently very regular, and generally have a roof of tough shale. In only a few cases, however, they rest on fire-clay, as more frequently the floor is of fine-grained conglomerate.

The principal seam, marked M, is 18 feet in thickness, resting on a white pipeclay and roofed by a dull, carbonaceous clay shale. The lower part of this seam is very black and compact, and contains the largest percentage of water and ash. Towards the top of the seam the coal acquires a more laminated character, and the brown, amorphous coal alternates with thin laminae of jet. No fragments of wood or traces of unaltered tissue can be observed in this coal; but in the shales above, leaves and stems of plants are of frequent occurrence, perfectly fossilized, but in a fragmentary condition.

The seam marked A is that which forms Coal Point. Only the upper part is exposed in the cliff, but it is probably 20 feet thick, as it forms a reef which extends to the seaward, and is exposed for several hundred yards at low water. The coal is variable in quality, but, on the whole, is similar to that in the seam at the mine, and might possibly be the same seam repeated.

Beyond Coal Point there is a change in the formation, on the coast, for a few chains, to blue, laminated clay, with fossil leaves, which are overlaid by gray sandstone. Northward of this only more recent formations are seen; a sandy limestone, with upper tertiary marine shells, occurring at one place five miles from Coal Point.

The first mine in this district was opened in 1858, in the 18-ft. seam marked M, and for some years was vigorously worked, a large quantity of coal being extracted at first by a wide irregular drive from the sea beach, but afterwards by an incline from the bottom of a gully, up which the coal was hauled to the level of the terrace, along which an iron tramway was laid for three-fourths of a mile to the Clutha River, to the level of which the coal was again lowered by an incline to the shipping wharf.

In 1864 a seam was opened in a more convenient position close to the river, and two miles north in a straight line from the old mine, and on the west side of the Kaitangata Range. The seams found here appear to correspond with those in the coast section, but the strata dip to the N.W. at 5° to 7° , which indicates that the intervening hill is an anticlinal arch. From the Kaitangata Range the hills drop in altitude to the north, and are less rugged for about six miles to where the conglomerates flank the east side of Mount Misery, and again rise to about 750 feet, resting on the schist rocks. The coal crops out in several gullies in this part of the range, and in the valley of the Tokomairiro an 8-ft. seam dipping to the N.E. was worked at an elevation of 600 feet above the sea level. The upper part of this seam, of which about 3,000 tons had been excavated as early as 1862, is soft and of dull brown colour; the lower half of the seam has a resinous lustre, and burns freely. The coal measures can be traced for nine miles north of the Tokomairiro Valley to the mouth of the Akeritu stream, north of which the schist rocks come down to the sea coast.

The Kaitangata hills will be the most convenient place to the railway from which to work this coal field; and with some modification of the furnace bars, I have no doubt that the coal will answer for the use of locomotives.

Fifteen analyses have been made of this coal from various seams, and the theoretical evaporative power obtained from the average of these is 5.34 lbs of water for each pound of coal used, the highest being the lower part of the Tokomairiro seam, which is 6.09. This coal is of the same value as fuel as the Southland brown coal, although I have seen no specimen that contains so much resin and burns so freely as the coal from the particular seam at Morley Creek. This is, however, an accidental and local peculiarity, that may be absent in one part of the seam and present in another. On the rise cut through by the road and railway south of Tokomairiro, there is a thick seam of inferior brown coal or lignite. This seam was very imperfectly exposed when I last saw it, but appears to be at least 12 feet thick, and to dip at a low angle to the S.W., being covered by pipeclay and gravel. Although of very great thickness, it is of inferior value as fuel.

GREEN ISLAND AND SADDLE HILL COAL FIELD.

This occupies a large area in the vicinity of Dunedin, in which the coal seams appear along the western boundary, in a line extending from the mouth of the Otokaia Creek for about nine miles, to the valley of the Water of Leith.

The strata, with the coal, probably have a trough shaped arrangement parallel with the coast, and the lowest beds that can be observed have a prevailing south-easterly dip, and, resting on schist rock,