

strata highly-inclined and much-disturbed, consisting of shaly mudstones, sandstone, and ferruginous rocks, either hæmatite more or less pure, or flinty jasperoid rocks. Throughout this formation there is a small percentage of lime, affording pasture-land of good quality. To the east, resting on these older rocks, with an east or south-east dip, the coal-rocks extend from [redacted] to north a distance of four miles, with an average breadth of one mile. The coal-measures lie at the base of this formation, the middle and upper beds being fossiliferous strata of marine origin, consisting mainly of arenaceous sandstones, with here and there beds of shelly limestone, or sandy beds full of shells. The whole eastern part is formed of papa-rock—a calcareous sandy clay—capped on the higher hills with isolated masses (often not *in situ*) of shelly limestone. A shelly limestone, *in situ*, appears in connection with the papa on the banks of the Tiraumea, near the northern limits of the area under description. The whole forms a denuded anticline of older rocks, flanked on the west by papa-rock, which at some distance is followed by the limestones of the Puketoi Range, and to the east by the coal-measures and overlying sandstones, followed by papa and limestone, as on the west side. The old rocks to the north disappear under the younger series, but to the south and south-west the old slates and sandstones are continuous for a considerable distance, and, as an unbroken line of outcrop, probably continue as far as the vicinity of Eketahuna.

TABLE OF FORMATIONS REPRESENTED.

- III. Upper Miocene.
  - (a.) Shelly limestones.
  - (b.) Papa-clays and soft, fossiliferous sandstones.
- IV. Lower Miocene.
  - (a.) Brown sandstones.
  - (b.) Sandstones, conglomerates, and shales with coal-seams.
- X.—XII. Trias (?) or Carboniferous.
  - (a.) Sandstones, mudstones, and indurated shales, with nests of hæmatite and bands of jasperoid rock.

III.—UPPER MIOCENE ROCKS.

These cover an extensive area in this and the adjoining districts to the north, north-east, and south. The upper division—(a.) Shelly limestones—appear as rocks *in situ* near the northern limit of the estate, and as isolated masses on the higher hills of the eastward part; but at any point their development and importance is not great.

(b.) *Papa-clays and Soft, Fossiliferous Sandstone.*—These rocks appear on both sides of the estate (east and west sides). On the west side they have within its boundaries but a limited extent between the Palæozoic rocks and Tiraumea River. Towards the base the beds are soft brown sandstones, alternating with or followed by shelly beds. Above these lie sandy or marly clays containing fossils and cement concretions. On the central part of the estate the lower beds of this formation extend throughout, but lie nearer the central part towards the western end. These beds are sufficiently fossiliferous to afford clear and distinct evidences of their age. The stray shells and shelly beds in these rocks afford lime to the soils which they produce, and hence the papa-country is superior in its soils to those resulting from the degradation of the sandstones of the coal-bearing series.

IV.—LOWER MIOCENE.

(a.) *Brown Sandstones.*—These strike north and south through the middle part of the estate, and form strata dipping to the eastward, and are of little further interest than the indication they afford of the continuity of the coal-bearing series, the outcrop of which lies between them and the old Secondary or Palæozoic rocks.

(b.) *Sandstones, Conglomerates, and Shales with Coal-seams.*—These underlie the brown sandstones with apparent conformity. The conglomerates can be traced from the Tiraumea on the north to the southern end of the estate, and to the west of these lies the line of coal. Coal has been discovered at only one place—at Cook's Tooth—and there, so far as explored, the seam is not of workable thickness. To the northward there is evidence of the outcropping of coal-shales and possible seams of coal in the various overgrown slips that occur on the side of the ranges, and an intelligent prospector would have no difficulty in following the line of coal in that direction. To the southward, as far as the saddle leading into the next watershed, the line of outcrop runs along a gully, where either by driving or sinking the coal should be reached.

So far, it is the existence of coal and the probability only of its occurring in seams of workable thickness that has been proved. The seam, as exposed in the pit put down alongside the road at Cook's Tooth, is crushed, and forms part of a slip which has affected one-half of the hill, on the north-western side of which the outcrop takes place. The measures exposed indicate the conditions under which thick and workable seams of coal are deposited, and it is from such premises that the opinion is expressed that a seam of coal of workable thickness may be found. The quality of the coal is indicated by the following analysis of it made in the Colonial Laboratory at Wellington:—

“ Analysis of No. 7271, brown coal, from Tiraumea Estate, Wairarapa North,—

Fixed carbon	...	...	...	...	...	...	39.13
Hydro-carbon	...	...	...	...	...	...	22.82
Water	...	...	...	...	...	...	20.41
Ash	...	...	...	...	...	...	17.64

100.00

Evaporative-power, 5.11lb.”