

formations in a general way; but I must inform the Committee that it is not strictly accurate, as, owing to the short notice, I have not been able to construct one specially suited for this inquiry. It is the map which was attached to Mr. Park's report which embodied all previous surveys, but it has been amended by more recent explorations. Where it fails is in not showing that certain younger limestone beds extend far into the interior as isolated patches on the hill-tops, and these probably exercise a beneficial effect on otherwise poor soil. For instance, the limestone which forms the coast-line at Waitotara actually reappears on the southern slopes of the Kaimanawa Range, north of Erehwon, at a height of over 3,200 feet. The chief object of the map I have now prepared is to show the area over which coal-bearing formations have been ascertained to extend, and the exact spots where coal outcrops are known to occur.

53. Nearly the whole of that coal formation would be more along the western than along the central route?—Certainly; it is best developed in the upper part of the Wanganui Valley and tributary valleys from the west, and it extends northward into the Mokau Valley, and is no doubt continuous to the Waikato coal basin.

54. I see part of the coal-bearing area is tapped by the central line?—Yes; for, according to Mr. Park, the coal formation represented by green sandstone is found in the bottom of very deep ravines, but no coal-seams have yet been found there. The map is also intended to show the extent of papa rock which commences at White Cliffs, south of Pukearuhe, and from thence towards south-east, occupies a large belt of the country which stretches to the base of the Ruahine Mountains. Its outline is a little different to that shown on this map, which is to be looked on as a diagram of a horizontal section from the sea-level upwards to 1,800ft. Where this papa rock occurs it causes the chief difficulty that has to be overcome by the engineer.

55. Why?—To get through this papa country always presents very great difficulties unless it is possible to take advantage of gravel terraces that skirt the larger rivers.

56. For what reason?—On account of the treacherous slips which take place from the papa rock; it is very bad standing ground in excavations.

57. On the other hand it is valuable as agricultural ground?—It is not first-class land. The surface is generally very broken.

58. Is it suitable as pastoral country?—Yes.

59. It carries cultivated grasses?—Yes; but its surface slopes are very steep. This kind of country is very well known. The belt of it must be crossed by any route which goes up to the interior from the coast-line anywhere between White Cliffs and the Rangitikei. The peculiarity of the Wanganui River is that it enters this papa rock-belt, and, instead of traversing it directly, it has cut a gorge through it lengthways, and emerges from the papa thirty miles to the east of where it entered its northern boundary.

60. What is the character of the country indicated by 3a on the map?—This formation underlies the papa, and is generally more sandy and gravelly in its nature. It contains a considerable abundance of cement-stones, and frequently lies immediately over the limestone which forms the upper member of coal-bearing formation in this district. This formation forms a better class of country than 3b.

61. Better also for carrying a railway through?—Yes; and for settlement. A better class of country still is 3c. It is a formation composed chiefly of shells, blue clay, silt, and soft calcareous sands with hard encrusted bands of limestone formed of broken shells recemented. The old slate rocks, which are the foundation of the country, are found in the Ruahine and Kaimanawa Mountains. There is only one isolated spot where such old rocks are known north-west of that within the map, and they are only exposed over a very small area where the Mokau River has cut through the overlying coal formation at the Waitara Falls. The three shades of pink colour on the map indicate the three different formations of volcanic origin. The darker colour is lava and other ejected rocks from the still active centres of Ruapehu and Tongariro. The next lightest colour is a portion of the great formation of trachyte-breccia, which extends over a large area of the north. It was formed by volcanic outbursts during which enormous masses of stones, sand, and volcanic mud were ejected. The lightest pink is a material derived from volcanic mud or washed down from the pumice or froth lavas by the rivers. These volcanic formations form the interior plateau which has a well-defined margin towards the west, and has an average level of 1,800ft. from the sea. In my opinion the margin of this plateau forms the eastern boundary of the useful country for settlement, except perhaps for tourists' traffic.

63. Seeing that a large portion of the central route is laid in country across that high plateau, do you consider that it is a desirable position for a railway?—I should think such a route should only be adopted if there are overwhelming engineering difficulties in the way elsewhere, or if the facilities are so great that the line could be made at a very much less cost; otherwise an endeavour should be made to carry the line through at a much lower level. It is obvious that all road-making, to feed the railway, should gravitate down towards the railway, otherwise you have all the loads taken up hill. But whether it is possible to follow, as suggested in my former evidence, the great valley of the Wanganui River, which intersects the whole country, I do not know; but I think it is desirable that this should be explored for. I do not mean by the valley the immediate water channel of the river, but the great valley that lies between the Ruapehu and Mount Egmont Mountains.

64. You mean it should follow the lower part of the watershed?—Yes, as far as possible. I know of no survey which has been yet made to test this question.

65. Then your evidence would point to much more extensive exploration on what is known as the central route?—Yes, the result of further exploration might lead to great improvement. There is one point that should be kept clearly in view, and it is a main point: we should endeavour to tap the coal-bearing country by the railway. Without handy coal the railway must work under great additional expense and disadvantage.

66. Can you give the Committee any information as to the climate of this high plateau which