

With the exception of the 6 miles at its mouth the Buller River runs for the most part through a very narrow valley, gorgy in places.

The Wairau Valley is open all the way from Tophouse to Blenheim, gradually widening out from the mere breadth of the river to a well-cultivated plain, 10 miles across. Above Tophouse the Wairau flows most of the way through precipitous gorges and steep mountain-slopes.

Between Tophouse and Belgrove the country consists chiefly of high ridges running down from the main range, with narrow valleys intervening. These valleys open out to plains between Belgrove and the sea; and one of them, the Waimea Plain, is perhaps the most densely-populated rural district in New Zealand.

There is, again, a narrow strip of low country between the Paparoa Range and the sea, and continuing up the coast to the Mokihinui River.

As will be seen by the forest map, the area affected by the railway in Canterbury and in Marlborough, and that portion of Nelson between Tophouse and Tasman Bay, is mostly open country; but nearly all the western watershed in Nelson and Westland is covered with bush.

*Scenery.*—Much of the country within the area accommodated by the proposed railways abounds in grand and beautiful scenery—an important factor in the traffic estimates. The Otira Gorge and other places on the Hokitika Road have been so often described by pen and pencil that they are now well known both at home and abroad. The Buller, also, which is little, if anything, inferior to the Otira, has received some attention within the last four years, since the road was opened.

Practically, however, these are the only two places which have been visited by the regular sightseers, although there are many others equally attractive. I shall mention some of them.

The gorge of the Waimakariri is unique in ruggedness—one of the wildest spots in New Zealand—and there is a magnificent waterfall, beautiful peaks, and a number of small glaciers easy of access at the headwaters of the same river. The Waiho glaciers and other Alpine scenery in the neighbourhood of Okarito constitute some of the most imposing sights in the colony; and the district has another attraction in the hot springs, one of which is within 2 miles of the principal glacier. This place even now is not difficult of access. Some of the West Coast lakes are very beautiful, more particularly Kanieri, Wahapo, and Mapourika.

The whole of the upland valleys at the base of the main range abound in fine scenery—rapid streams flowing through grassy glades that are skirted with bush and backed by mountains. The Wairau Gorge, about twenty miles from Tophouse, in an accessible situation, is by some considered equal to the Otira. Last of all I should make special mention of Fox's River, which reaches the coast at Brighton. It flows through a limestone ravine of exquisite beauty and grandeur, like some of the finer reaches of the Wanganui.

*Geology.*—The following sketch of the geology of the area affected by the railways is prepared chiefly from the publications of the Geological Department, supplemented by my own observations.

The subsidiary range in Canterbury is composed of slates and sandstones of the earlier geological periods, flanked by other sedimentary rocks of more recent formation. The latter contain the Malvern coal-beds, pottery-clays, and other minerals. At Castlehill, between the two ranges, there occurs a small deposit of a still more recent period, containing about eight hundred acres of limestone, the same class as that at Oamaru. The flat lands in the Upper Waimakariri Valley are chiefly fans built up by streams from the mountains. Some of them are a mile or two in width, and, being generally regular in shape and covered with grass or bush, they are not always noticed.

The main range for its entire length, from Wakatipu to Cook Strait, is composed of clay-slates and schists of varying consistency. Clay-slate occurs again in a long narrow belt, extending from Reefton along the western slopes of the Brunner Mountains to Lyell, and onwards to the headwaters of the Mokihinui and Karamea. The same formation also appears on the south-eastern flank of the Paparoa Range, and in a small patch at Ross.

The main range is flanked on the western side for nearly the whole length of Westland by granite and other crystalline rocks. These rocks again form a continuous chain in the Victoria, Brunner, and Lyell Mountains, and the main ridge extending therefrom to Separation Point. At Mount Owen, near the middle of this chain, the granitic rocks branch off in a broad belt to the headwaters of the Buller, where they disappear under the slates of the main range. Granite and other crystalline rocks occur again in the top of the Paparoa Range.

According to special information kindly furnished by Dr. Hector, the principal coal-bearing formations in the area accommodated by the proposed railways occur as follows:—

1. At Greymouth, extending along the coast from Marsden to the Maukurunui Creek, and up the Grey Valley to the Arnould River.
2. At the Blackball Creek, extending northwards along the eastern slope of the Paparoa Range to the headwaters of Moonlight Creek.
3. From Reefton down the Inangahua Valley to the Buller, and across the ranges and Mount Rochfort Plateau to Ngakawau and Mokihinui.
4. In the Upper Buller watershed, extending in one direction from within five miles of Cannibal Gorge to the Owen River, and in the other from Fern Flat to Lake Rotoroa.
5. A small patch on the watershed between the Mokihinui, Karamea, and Wangapeka Rivers.
6. A small patch in the vicinity of the Kanieri Lake.
7. Between the Paparoa Range and the sea, extending along the coast from Razorback to the Buller River.
8. In the Motueka watershed, extending from Mount Owen to the Baton River.

The last three in the above list occur in newer rocks than the others, and the same formation appears also in the vicinity of Marsden and in the Upper Grey and Lower Motueka Valleys.