WATER POWER IN NEW ZEALAND.

THE first of the New Zealand Government's schemes for developing electric power from hydraulic sources has just been completed. This plant at Lake Coleridge is the first-fruit of the much criticized Water-Power Bill, the aim of which is to provide the whole Dominion with electricity from the very plentiful supply of water-power resources, estimated at 4,000,000 horse-power. This scheme is thus interesting as an experiment, as well as an example of hydro-electric practice, and its inauguration has attracted considerable attention. It was preceded by others in various parts of the colony, and it is to be followed immediately by more enterprises authorized by Parliament, and by others under private auspices. Mr. W. Wilson, B.E., has an article in the June issue of the Engineering Magazine concerning New Zealand's hydro-electric developments. From it the following is extracted:

New Zealand is for the most part a narrow land, approximately 1,100 miles in length and 94 miles in average width. The South Island, the larger of the two, is nowhere wider than 180 miles, while throughout almost its whole length of 525 miles, a backbone of alpine mountains raises the interior to a height of as much as 10,000 or 12,000 feet. The North Island is slightly smaller, more irregular in outline, and with the exception of several volcanic peaks of about 7,000 feet, the frequent mountain chains rise to heights up to 4,000 feet. Thus it will be seen that the conditions strongly favor an abundant rainfall, and frequent changes in the land-level. Hence New Zealand is exceptionally rich in water-power.

The most numerous and generally the easiest schemes to develop occur among the mountains, where there are a myriad of large and small cataracts and waterfalls. Examples of successful plants in such situations are found at the big Waipori Falls Station, at Te Aroha, at the Holt's Creek and Punchbowl Stations of the Otira Tunnel, and at other places. The best of these have a way of occurring in hardly accessible situations, and the supply is not very constant. Storage is not as a rule easy to provide, owing to the movement of shingle during floods. It is, therefore, from the big rivers and lakes of the lower country that most power is at present being drawn. Lakes are very plentiful all over the Dominion, especially near the borders of the ranges. In many cases a direct fall can be obtained from them by tunneling, as at Lakes Kanieri and Coleridge. In other cases they act as perfect storage reservoirs for the rivers flowing from or through them, as in the case of Lake Taupo and the Waikato River, and of Lakes Rotorua and Ratoiti and the Kaituna. Finally, in the south-west of the colony there is a long stretch of coastline indented with deep fiords—submerged valleys which have been hollowed out by extensive glacier action —so that the tributary valleys are cut back, forming hanging stream-beds from which many waterfalls flow into these arms of the sea. Here the conditions resemble those existing in Norway, and excellent opportunities for cheap power are presented. At present the country surrounding the fiords is more picturesque than useful and is practically uninhabited. So far no development has been undertaken in this region.

Of all these stores of energy the Goverment has primary control and has embarked upon the policy of developing certain large schemes itself, but permits private individuals, companies, or corporations to utilize practically any water-power, subject to an annual payment for the privilege. Until the present Government assumed office in 1911, this favorable state of things by no means existed; their predecessors adopting the extremes, first of over-generosity, and then of almost complete obstruction.

About thirteen years ago a private company applied for rights to use the energy latent in the Waipori Falls, some 30 miles from the City of Dunedin. This request was granted without any payment. Not long afterwards the city corporation wished to take over the project, and purchased from the company the water-rights which had been acquired for nothing. This transaction so acted upon the Government that they switched over to the opposite policy of not parting with their water assets for any reasonable consideration. Instead, they announced, after some delay, their intention of expending £2,000,000 upon eight schemes distributed through the Dominion, at the following places:—

Locality.	H.P.	Cost.
1. Wairua Falls, North Auckland	3,000	£100,000
2. River Kaituna, South Auckland	10,000	320,000
3. Makuri, North Wellington	6,000	200,000
4. River Hutt, South Wellington..	10,000	300,000
5. Lake Coleridge, Canterbury ...	10,000	270,000
6. Kumara, Westland	3,000	75,000
7. Teviot, Otago	10,000	300,000
8. Lake Hauroto, Southland	10,000	350,000

It was proposed to make an immediate start with locations Nos. 1, 4 and 5 at once. The current from all was to be retailed on a basis of 2d. per unit for light, and 1d. for power.

However, this extensive programme was not followed. Instead, it was decided to complete No. 5 as soon as possible, and to use the experience so gained in carrying out the others. At the end of nearly four years, the plant mentioned is now in operation, but in the meantime the Government, which had held office continuously for 21 years, was replaced by one whose announced intention was to afford much greater facilities for the use of water-power. At once, a private company purchased, for £150 per annum, the rights to the Wairua Falls, No. 1 on the foregoing list, and their station is fast approaching completion. Other enterprise has taken place on smaller schemes, and is foreshadowed on a larger scale in the near future, though the rapid improvement in the lignite gas-producer has assisted the institution of small local power houses at the expense of the hydraulic central station.

New Zealand farmers are recognizing more and more the great advantages of electricity not only for lighting, but also for shearing, pumping, chaff-cutting, and the host of operations on a farm performed nowadays by machinery. Such plants, driven by hydro-electric current, are established at Kaiwarra, Glenmark, Hawarden, and Temuka, in Canterbury, and in other parts of the Dominion. So far, electric ploughing has not yet made its appearance but this should not be long delayed.

Future opportunities for power development occur over almost the whole country. Practically every one of the numerous lakes is a potential power site of the most satisfactory order, and in spite of the war activity in exploitation should continue. In one of the big schemes now under construction it was found that the electric machinery, though nominally British, was of German manufacture and could not be delivered. However, the deficiency was at once made good by an American firm and the opening will not be delayed by the change. For a long time New Zealand will be dependent upon imported