

The collection of all possible information regarding yearly flow from all important catchment-areas likely to be utilised for water-power, should be begun and carried on continuously. Observations for a long period are required for the proper design of hydraulic works, unless great sacrifices of power are made, or risks taken needlessly as to the size of works; also heights along all important rivers and streams should be ascertained. If full information were available as to heights along streams, many possibilities would readily suggest themselves.

In addition to data for water-power development, a complementary investigation is required regarding all the existing industries to whose expansion providing electric motive power at low rates would materially contribute; or regarding industries now non-existent in New Zealand which could be established with profit if aided by the supply of power at low rates.

In French Alpine hydraulic electro-chemical factories, the products are carbide of calcium, alkaline carbides and chlorates, sodium and its derivatives, carborundum, and aluminium. In 1901 there were seventeen factories engaged in the manufacture of these products. The power used varied from 600-horse power to 10,000-horse power, the total for the seventeen factories being 74,000-horse power. Other factories manufacture paper, wood-pulp, &c. One of these is of sufficient magnitude to use 5,000-horse power.

It has been suggested by Sir W. Crookes and others, that nitrates can be manufactured by a hydro-electric process more cheaply than they can be procured from Chilian deserts. Should a satisfactory process ever be evolved, and it seems feasible, then some of the large New Zealand schemes, such as Hauroko, Manapouri, Te Anau, Hawea, Tekapo, Clarence, and others, would prove of value sooner than they otherwise would, for by using some or all of them to manufacture nitrogenous fertilisers, the yield from New Zealand wheat lands could not only be materially increased, but also a relatively permanent yield secured. Other contingent advantages would no doubt also accrue.

For the manufacture of nitrates by electrical processes, a supply of power at a cheap rate is required—much cheaper than can be got from coal. It is thought such power could be got from Niagara, but it could be got equally well from some possible New Zealand power schemes.

As some of the largest and most valuable developments possible in the colony involve raising lake-levels by dams, forming large reservoirs by dams across rivers, and the diversion of large volumes of water from one river-valley to another, &c., action might be taken to secure all necessary reserves of land, and all rights that may be required to secure the complete development of all possible power schemes in the future, unhampered by any unnecessary adverse conditions.

If it is desired to take immediate action as regards the development of water-power, the schemes to be first completely investigated as the most promising are: Rotoiti-Kaituna, and Huka as alternatives; Mangawhero to Wanganui; Tauherenikau; Hutt; Waihopai; Roding and Rotoiti (Buller); Clarence-Waiarau, and Coleridge as alternatives; Opihi; Teviot and Hawea as alternatives; Mono-wai and Hauroko schemes as alternatives. For these schemes observations to ascertain the flow of water more definitely should be started as soon as possible; then surveys to determine the proper location, and the magnitude of the requisite works would be required. When this information has been got and surveys made, it would then be possible to prepare detailed estimates of the cost of each scheme complete, and to investigate the economic value of each more exhaustively than is at present possible.

Many points of some importance relating to individual schemes have not been referred to in this report. These would be dealt with in special and independent reports on each scheme.

A note is attached showing amount of steam-power used in Great Britain, United States, and the Continent of Europe, for fixed steam plant on land and in locomotives. I have not been able to get information later than the years given. Complete and more detailed information of the same character up to the present time would help in judging the probable growth of the use of power in New Zealand, and might help in suggesting possible extensions. The figures give an idea of the power used by the great industrial nations in past years, and the rate at which the use of power has grown. A study of the figures, I think, shows that it will be possible to develop gradually and prudently the hydraulic-power resources of New Zealand in such a way as to render immense help to the development of future industries by supplying large amounts of power at cheap rates to meet ever-increasing demands.

The Surveyor-General has supplied much information for this report; Mr. R. W. Holmes for the central region of the North Island; and the various Public Works district officers for their several districts. Mr. H. Vickerman, B.Sc., has rendered most efficient assistance in computations and preparation of plans and data.

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#### NOTE ON POWER USED IN VARIOUS COUNTRIES.

(From Mulhall's Dictionary of Statistics.)

##### FIXED STEAM-POWER.

Year.	United Kingdom.		Continent of Europe.	United States.	Colonies.
	Population.	Power.			
		H.p.	H.p.	H.p.	H.p.
1840	26,700,000	350,000	100,000	360,000	20,000
1850	27,500,000	500,000	220,000	600,000	40,000
1860	29,070,000	700,000	650,000	800,000	70,000
1870	31,629,000	900,000	1,860,000	1,220,000	120,000
1880	35,026,000	2,000,000	3,270,000	2,200,000	200,000
1888	37,188,000	2,200,000	4,150,000	3,300,000	400,000