

Story: Hay, Peter Seton

1904

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1852/1853?–1907

Civil engineer, public servant

This biography, written by Peter Lowe, was first published in the Dictionary of New Zealand Biography, vol 2, 1993.

Peter Seton Hay was born in Glasgow, Scotland, probably in 1852 or 1853, the son of Janet (Jessie) Dalziel and her husband, James Johnston Hay, a journeyman engineer. When Peter was a child the family emigrated to New Zealand, arriving at Port Chalmers on the *Storm Cloud* in April 1860. Educated in Dunedin, he was the first graduate of the newly established University of Otago, obtaining a BA in 1877 and an MA with first-class honours in mathematics in 1878.

In June 1875 on the advice of a university teacher he had joined the Public Works Department as an engineering cadet. After completing his studies he was engaged in railway surveys and construction for the lines from Dunedin to Moeraki and Clinton. In the early 1880s he was employed on Central Otago railway surveys from Rough Ridge to Hawea, in the Cromwell district, and from Balclutha to the Catlins River. Hay's reputation as a brilliant young engineer was established in these Otago days. Stories were told of his prodigious mental calculations when he was working in the field without the usual aids such as logarithm tables. It was later recounted that he solved abstruse mathematical problems in his leisure hours, preferring this pastime to 'the recreations of ordinary men'.

In 1884 Hay was transferred to the head office of the Public Works Department in Wellington. He began his steady progress through the ranks of the department, and two years later was promoted to resident engineer. He was often called on by the engineer-in-chief, John Blackett, to tackle unusual design problems. A recurring difficulty which he helped to resolve was the obstruction of the Timaru Harbour works by the deposition of tidal sand in Caroline Bay.

In 1896 he was promoted to superintending engineer, equivalent to assistant engineer-in-chief. By then the construction of the North Island main trunk rail link was the foremost Public Works Department project. Hay helped plan most of the important railway works of the central North Island section and was responsible for the primary design of the Makohine, Mangaweka, Hapuawhenua, Taonui, Manganui-a-te-ao and Makatote viaducts. The erection of these viaducts was a major undertaking: they were fabricated in steel, which was then a fairly new construction material. Because the sites were isolated and relatively inaccessible, transport and handling of the steel created special difficulties. Some of the structures, namely the Makohine, Hapuawhenua and Taonui viaducts, were made and erected by the Public Works Department, while others were contracted out to private firms. The Makatote and Manganui-a-te-ao viaducts, for instance, were contracted to the engineering firm Andersons of Christchurch. By any standards the viaducts were great works of engineering. Much of the credit for their construction must be attributed to Peter Hay.

Hay succeeded W. H. Hales as engineer-in-chief of the Public Works Department in 1906, only to die in office on 19 March 1907. He suffered the effects of exposure while inspecting the main trunk railway works near Waiouru, and subsequently died from pleurisy at his home in Wadestown, Wellington. He was aged 54.

One of Hay's major achievements was his investigation and report on the proposed Southern Alps rail crossing by the Midland railway in 1903. The scheme recommended by the government's American advisory engineer, Virgil Gay Bogue, required a 3½-mile tunnel and a steep gradient incline track. Hay's scheme, which was ultimately adopted, avoided expensive grading and track work but required a tunnel over five miles long. This tunnel, at Otira, was completed in 1923, long after Hay's death.

Equally important was Hay's contribution to the development of hydroelectric power generation in New Zealand. Pioneering surveys of water power resources were initiated by the government in the late nineteenth century. The most important report arising from these investigations was written **by Hay in September 1904**. It was the outcome of many years of patient preparatory work by Hay and officers of the Public Works Department. The report was a wide-ranging discussion of hydroelectric potential, focusing on both North and South Island sites. It anticipated many of the major works that were eventually built. In the North Island, the Waikato, Waikaremoana and Mangawhero–Wanganui catchments were singled out; in the South Island, particular attention was paid to the lake and river systems associated with Lakes Coleridge, Hawea, Te Anau and Manapouri. We can now only speculate on how some of the hydrological information was gathered and estimates of power potential made.

Many of Hay's ideas have stood the test of time. He proposed that having passed through the turbines Manapouri water should be drained via tunnels to Smith Sound (Malaspina Reach). This sound is in fact part of the Doubtful Sound complex into which the present day Manapouri tailwater discharges. As electrical transmission costs and technical difficulties were considerable in 1904, he further suggested that much of the Manapouri-derived electrical power should be used in electrochemical or electrometallurgical applications, including aluminium smelting. Sixty years later these concepts became reality. He concluded his report with the prophetic statement that the 'potentialities of water-power will remain as a national asset as long as the climatic conditions and the mountains endure'.

Peter Seton Hay married Mary Clarke at Wairuna, Otago, on 22 April 1879 and they had four sons and one daughter. His wife and children survived him. Hay was the first New Zealand-trained engineer to rise to the rank of engineer-in-chief. He died at the height of his powers and before many of his projects had been completed. Although his life was relatively brief, his works endured. He left a worthy legacy to later generations.

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