

the bed of the river. The system was also employed for the Willington Viaduct, for a Bridge at Dalkeith, for the Duke of Buccleuch, and numerous other bridges and structures to which it was thought applicable. They are alluded to in the Paper on Timber Bridges, read to the Institution in 1841,¹ for which a Telford Medal was awarded to Mr. B. Green.

This mode of construction was also proposed in 1839 by Messrs. J. and B. Green, for the first design for a High Level Bridge between Newcastle and Gateshead. This project having been adopted by the York, Newcastle, and Berwick Railway Company, the construction of the bridge naturally devolved upon Mr. Robert Stephenson, M.P., V.P., their Engineer, and the present excellent structure is the result.

Messrs. Green also executed the corn warehouse at the Manor Station, Newcastle; and also the intermediate station houses, on the line between Newcastle and Berwick. He was engaged for many years, and up to his death, by the Duke of Northumberland, as architect for the farm-buildings on a great portion of his Grace's estates in Northumberland.

The Theatre and the "Grey" Column, at Newcastle, the "Durham" Monument on Pensher Hill, the Churches at Stockton-on-Tees and at Middlesborough-on-Tees, with numerous other buildings, kept the later years of Mr. John Green very fully occupied, and he died on 30th September 1852, greatly regretted by a large circle of private and professional friends. He joined this Institution as a Member in the year 1840, and though, from his distant residence, he was rarely able to attend the meetings, he always exhibited great interest in the proceedings, and anxiety for the progress of the Society.

MAJOR-GENERAL WILLIAM GIBBS MACNEILL was born at Wilmington, North Carolina, on the 3rd of October, 1801. His great-grandfather, a member of a Highland clan, after distinguishing himself at the fatal battle of Culloden, emigrated to North America, with the celebrated Flora Macdonald, in 1746. His father, after receiving his education in the Me-

¹ *Vide* Min. Proc. Inst. C.E., vol. i., Session 1841, p. 88; and vol. v., p. 219; also Report Brit. Assoc. 1838, vol. vii., Transactions of Sections, p. 150.

dical School at Edinburgh, served with the British army in the West Indies, and eventually settled at Wilmington, North Carolina, where he practised with considerable reputation as a physician.

The subject of this memoir received the early part of his education at a school near New York, whence he was removed to the Episcopal Seminary, with the intention of studying for the Church; but having been taken by his early friend General Swift to visit the Military Academy at West Point, he expressed a wish to abandon his intended peaceful career, and the General having obtained an appointment for him as a cadet, which was granted by President James Madison, he, on the 23rd July, 1814, entered the Academy, where, under the able direction of Captain Crozat, (ancien élève de l'Ecole Polytechnique), he soon attained a distinguished position. Among his comrades was George W. Whistler, who was only one year older, and who entered the Academy at the same time with William Gibbs MacNeill. Similarity of tastes induced a firm friendship; they received their commissions simultaneously in the United States army, served together, were subsequently engaged as Engineers on the same great public works,—their joint opinion was sought in almost all extensive operations, and their intimate connexion was only severed by the lamented decease of Major Whistler in 1849, at St. Petersburg, where his valuable services had been secured by the Russian Government for the construction of the Moscow Railway.

William Gibbs MacNeill received his commission, as third Lieutenant of Artillery, in 1817,¹ was assigned to duty with the Corps of Engineers under the command of Brigadier-General

¹ Extract from the "Register of the Officers and Graduates of the U. S. Military Academy, at West Point, New York," from March 16, 1802, to January 2, 1850, compiled by Captain G. W. Cullum, R. E.

"William Gibbs MacNeill—promoted Third Lieut., Corps of Artillery, July 17, 1817.—Second Lieut., March 1, 1818.—First Lieut., Dec. 4, 1819.—Retained, as First Lieut., 1st Artillery, in re-organization of army, June 1, 1821.—Brevet-Capt., Topographical Engineers, Jan. 27, 1823.—Brevet-Major, Jan. 27, 1833, 'for faithful service ten years in one grade.'—Brevet-Major, Topographical Engineers, Jan. 28, 1834.—Resigned, Nov. 23, 1837 (his Majority in the Corps of Topographical Engineers,—retaining his rank of Brevet-Major, U. S. Army).—Major-Gen., R. I. Militia, 1842."

Swift, and was employed on the coast survey, the expedition being conducted by Colonel John Abert, the present chief of the Corps of Topographical Engineers, with the co-operation of the able astronomer Hassler. His promotion was very rapid. In 1834 he had attained the rank of Major of Topographical Engineers, and in 1837 he resigned his commission in that branch of the service, being allowed to retain his rank in the United States army.

Although he was chiefly engaged in pursuits somewhat analogous to civil employment, William Gibbs MacNeill exhibited on several occasions considerable military skill, coolness, and courage. During the war in Florida, in 1819, he acted as aide-de-camp to 'Old Hickory' (Major-General Jackson), and subsequently, as Adjutant-General to Major-General Gaines. On the occurrence of the 'Dorr' insurrection in Rhode Island, the command was intrusted to him, and by the caution and prudence, as well as strategic skill he displayed, the disturbances were quelled without bloodshed.

It is, however, with his civil services that this Institution is most concerned; these were as various as they were numerous, and occurring at the commencement of the railway era, they possess peculiar interest. During his service in the Topographical Corps he was employed to ascertain the practicability, and to estimate the expense, of constructing a railway, or a canal, across the Alleghany Mountains, so as to establish a communication between Chesapeake Bay and the Ohio River, in fact, to surmount, by artificial works, the natural barrier between the Eastern and the Western States; and subsequently, in the same range, to trace a line from the Susquehanna River on the north, to the Savannah River, in Georgia, on the south. The latent spark thus fired speedily induced the recognition of his merit; he was made a Member of the Board of Engineers, and in 1828 was deputed, with his comrades, G. W. Whistler and J. Knight, to visit Europe, and examine the public works, but more especially, the existing railways and those in course of construction. From our First President, Telford, the young American Engineers received a cordial welcome, and introductions, through which they were admitted to friendly intercourse with George Stephenson, Walker, R. Stephenson, Locke, Hartley, Stevenson (of Edinburgh), Palmer,

Rastrick, Macneill, and many other Engineers, since celebrated, and of the advantages derived from the information, so freely imparted, our late Member always spoke in the most grateful terms¹.

The Liverpool and Manchester Railway, and other lines, were then in course of construction, and impressed with the anticipated advantages of this new mode of transit, MacNeill, on his return to the United States, successfully exerted every means of exciting his countrymen to the construction of similar works; the professional assistance of men who had acquired such accurate acquaintance with the subject was naturally sought, and MacNeill and Whistler became the joint Engineers to the majority of the railways, whether projected or executed.² He was also appointed to carry out the grand design for the Dry Docks at the Navy-yard, Brooklyn, New York, but their completion was finally intrusted to Mr. William J. M'Alpine, under the superintendence of General C. B. Stuart.³

The labours thus imposed on him severely tried his powers, and in 1851 he visited Europe for the benefit of his health. At that period he was elected a Member of this Institution, and on several occasions took part in the discussions, seizing every opportunity of expressing his sense of the benefits he had received in early life from English Engineers, and his readiness to return the obligations, by aiding any young professional men who might visit the United States.

During his residence in London he was actively engaged in

¹ *Vide* Minutes of Proceedings Inst. C. E., 1851-52, vol. xi., p. 66.

² The following are a few of the lines in which he was engaged, alone, or conjointly with Whistler:—"Member of Board of Engineers, Baltimore and Ohio Railway, from 1827 to 1829.—Chief Engineer of Baltimore and Susquehanna Railroad, from 1829 to 1836; of Paterson and Hudson River Railroad, from 1831 to 1834; of Boston and Providence Railroad, from 1832 to 1835; of Providence and Stonington Railroad, from 1832 to 1837; of Taunton and New Bedford Railroad, 1835; of Fatteyville and Yadkin Railroad, N. C., 1835; of Long Island Railroad, 1835-36; of Western Railroad, from Worcester, Mass., to Albany, N. Y., from 1836 to 1840; of the State of Georgia, 1837; of Charlestown, Louisville, and Cincinnati Railroad, from 1837 to 1840; and of Dry Dock, Navy Yard, Brooklyn, N. Y., 1844-45.—President of Chesapeake and Ohio Canal Company, 1842-43.—Consulting Engineer of various Railroads, and other Public Works in the United States and Cuba, since 1830."

³ *Vide* "The Naval Dry Docks of the United States," by Charles B. Stuart, Engineer-in-Chief of the U. S. Navy. 4to. Plates. New York. 1852.

some large mining projects in America, whither he returned, somewhat suddenly, in February 1853, only to draw his last breath amidst his relatives and friends, and the latter formed a large circle, for he rendered himself generally beloved by a kind, affable, and impressive manner, and the real services he could and did render to many. He possessed a ready eloquence, a clear head, firmness of purpose, and a peculiar talent for influencing and controlling the minds of men; and, but for his individual energy, many of the projects now in successful operation in the United States would have been suspended, if not abandoned.

His numerous professional reports were drawn up in a manly, powerful style, and comprising, as they do, the early history of railway enterprise in the United States, they well deserve to be collected and published, as records of his labours, in conjunction with Messrs. Robert Goodbee Harper, George Winchester, Francis Thomas, and others, to whose far-sighted energy the State of Maryland, and indeed the Union generally, is so deeply indebted, for appreciating the merit, and affording the means for developing the talent, of such men as Mac Neill and Whistler.

That his ability and personal influence were acknowledged in his native country is evident, from his receiving the co-operation of such men as Henry Clay, J. C. Calhoun, Daniel Webster, John Crittenden, Patrick T. Jackson, and Robert J. Walker, with whom he maintained the most intimate and friendly intercourse, and by whom his views were always received with great consideration.

In private life he was universally respected, by his family he was much beloved, and in announcing his decease, which occurred almost suddenly, at Brooklyn, on the 16th February, 1853, in his fifty-second year, his old friend and comrade, General Swift, was fully justified in writing of him—

“He had a kind, liberal, and noble heart, and was always ready to advise, or assist a friend and aid the poor. In all the relations of life he was a man. Young Engineers always found in him the kindest of friends; if perplexed in their work, or thwarted by difficult problems, he always stood ready to give them aid, and to instruct them by his benevolent advice.

“Such a man, stricken down in the prime of life, is a great loss, not alone to his amiable family, but to science and to the public at large.”

Mr. GEORGE BRADSHAW was born at Pendleton, near Manchester, in the year 1800 ; his parents, who were industrious honourable persons, taxed their limited means to the utmost to give a good education to their only child ; he was therefore placed under the care of Mr. Coward, a Swedenborgian minister of some eminence at that period ; from thence he was removed to a school kept by Mr. Scott, at Overton, Lancashire, but he does not appear to have had much aptitude for scholastic exercises, or what is very probable, his character was not understood by his teachers, so he left school at about fourteen years of age without having made the progress that might have been expected from the advantages he enjoyed. This was a source of deep regret in after life, and he laboured hard to supply the deficiencies in the branches of knowledge essential for his ordinary pursuits.

On leaving school he was apprenticed to Mr. Beale, an engraver of some eminence, who had acquired reputation by the execution of the plates of Duncan Smith's four books of penmanship, and other works of the period.¹

In the year 1820 he accompanied his parents to Belfast, and there established himself as an engraver and printer ; but after about a year's trial, not finding adequate occupation, he returned and settled at Manchester.

His attention had for some time been directed to the engraving of maps, and in 1827-28, he determined to devote himself more especially to that branch of art. The first map projected, engraved and published by him, was one of Lancashire, his native county. This was followed by his map of the canals of Lancashire, Yorkshire, Cheshire, Derbyshire, and Staffordshire ; on which was given the lengths, and levels of the canals, and navigable rivers, with the width and depth of the locks,—their height, above low-water mark, at Liverpool, com-

¹ The latter portion of Mr. Beale's career was not fortunate, and with characteristic kindness Mr. Bradshaw, in the most unpretending manner, exerted himself effectually to alleviate the misfortunes of his early instructor.

[1853-54.]