

line in the colony; the first connecting Sydney with Parramatta and the second Sydney with South Head. On the retirement of Captain (now Colonel) B. H. Martindale in 1861, Mr. Cracknell was appointed Superintendent of Telegraphs, a post which he held until his death.

Some idea of the work he carried out may be obtained when it is stated that there are now in the colony of New South Wales about 600 telegraph- and telephone-stations and over 22,000 miles of line open, and that the equipment of the various stations and offices is of the most complete and modern kind. Mr. Cracknell took great interest in the scientific side of military work and in 1874 received a commission as Lieutenant in the Torpedo Corps attached to the Naval Brigade of the colony. Three years later, when this corps was transferred to the Military Department under the style of the Submarine Miners Corps, he was promoted to the rank of Major and in 1886 was gazetted Lieutenant-Colonel Commanding. It was from over exertion in connection with an all-day parade of this corps that he contracted the attack of *angina pectoris* which ended fatally on the 7th of January, 1893.

Mr. Cracknell was a most capable and efficient chief of the Telegraph Department of New South Wales. In 1885 he represented that colony at the Berlin Postal Conference, from which he brought back and subsequently made use of much valuable information. The duplex and quadruplex systems, now generally used throughout Australia, were introduced by him.

Mr. Cracknell was elected an Associate of the Institution on the 6th of March, 1866, was placed in the class of Associate Member on its creation in 1878, and was transferred to the class of Member on the 30th of March, 1886.

JAMES BARRY FARRELL was born at Bristol on the 3rd of December, 1810. After serving a pupilage to Mr. Joseph Burke, Civil Engineer, he was engaged from 1833 to 1838 under the Board of Public Works in Ireland as Resident Engineer on the survey and construction of the road between Killarney and Kenmare, so well known to tourists. He then acted for a time as County Surveyor of Tyrone and in 1840 was appointed County Surveyor of Wexford, which post he held until shortly before his death—a period of upwards of fifty years. The first work of importance which he designed and constructed in this capacity was Carrigmannon Bridge, a stone structure having 3 arches each

of 50 feet span. It crosses a deep ravine on the Carlow road and at the centre has a height of 120 feet. He subsequently designed a similar bridge at Cooladine, near Enniscorthy.

About the year 1862 Mr. Farrell was appointed Engineer to the Admiralty Commissioners for Wexford Harbour, in connection with which he was engaged on several works under the direction of the late Sir John Coode.¹ One of the principal of these was the deepening of the North and South channels lying between the Dogger Bank and the entrance to Wexford Haven, and the cutting of a deep water channel thence to the quays at Wexford. He conceived the idea of raising the Dogger Bank, which was submerged at high-water, so as to bring it above the influence of tides, and believed that this would so regulate the ebb and flow as to prevent the shifting of the channels and result in a sufficient depth of water to admit of navigation at all times. He first adopted wooden piles to arrest the sand as it washed across the bank at high-water or was blown across at low tide. This method, however, being too expensive, Mr. Farrell resorted to bags of sand, which proved successful up to a certain height; but ultimately the plan was abandoned. He also reported for the Admiralty on various harbour projects at Belfast, Cork, Limerick, Galway, Castlemaine Estuary and other places.

Mr. Farrell designed and erected the new bridge across the River Slaney at Wexford, which took the place of the old toll bridge. It consists of piers of wooden piles, with a superstructure of iron girders from pier to pier and a drawbridge in the centre. In the winter of 1866-67 an old wooden structure across the River Barrow at New Ross, connecting the counties of Wexford and Kilkenny, was swept away by an accumulation of ice. The new bridge, chiefly of iron, was designed jointly by Mr. S. U. Roberts of the Board of Works, Mr. Peter Burtchaell, now Surveyor of County Kilkenny, and Mr. Farrell. Its design and construction were fully described in a Paper² presented to the Institution in 1871 by Mr. H. N. Maynard.

Mr. Farrell retired from the County Surveyorship of Wexford about a year before his death, which took place on the 3rd of January, 1893. In disposition he was generous and kind-hearted—a sincere friend to many. He was elected a Member of the Institution on the 24th of May, 1870.

¹ *Ante*, p. 334.

² Minutes of Proceedings Inst. C.E., vol. xxxii. p. 146.