

were followed to the cemetery, by a greater number of persons than had, on any former occasion ever paid the last mark of respect to a Protestant in that city. The Piedmontese journals, at the same time, published highly eulogistic articles respecting his character as a man, and his abilities as an Engineer.

Mr. Woodhouse became a Member of the Institution in the year 1838. Those who knew him best, considered him to be an excellent judge of work, and of its fair value to a Contractor, and they placed great reliance on the accuracy of his estimates; and his unassuming and conciliatory demeanour was of great value in many difficult negotiations and arbitrations. His constant avocations at a distance from the Metropolis, prevented his taking any active part in the affairs of the Institution, but he always evinced great interest in its welfare.

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MR. JAMES BEATTY, son of Dr. Beatty, was born on the 31st March 1820, at Enniskillen, in Ireland. He was educated in classics by his Father, and in English and mathematics by masters. He so early in life showed such mathematical and constructive talent, that his Father determined upon the profession of a Civil Engineer for him. Accordingly, when about fifteen years of age, he became a pupil of the late Mr. T. J. Woodhouse, M. Inst. C.E., who was at that time engaged, as Resident Engineer, in the construction of the Midland Counties Railway. This gentleman had a high opinion of young Beatty, who became so useful, that at the expiration of his pupilage, he was employed for two years as an Assistant Engineer on the railway. In 1840, he was engaged in surveying the Manchester and Derby line.

In 1842, he was engaged by Messrs. Peto and Betts on the Norwich and Brandon and Lowestoft lines; and in 1845 he was appointed by the same firm their chief Agent and Engineer, charged with the execution of the works on the Southampton and Dorchester Railway. In the summer of 1852, he was sent out by Messrs. Peto and Betts, with Mr. Donald Campbell, appointed by Mr. J. Locke, M.P., V.P., to explore and lay out the European and North American Railway, in New Brunswick, a link in the chain of railways, intended to connect Halifax, the nearest port to England, with the inmost recesses of Canada and the United States. On arriving at St. John's, there remained only about three months, in which to make the necessary surveys, sections, &c., the greater portion being through the primæval forest. However, owing to Mr. Beatty's great energy, and by incredible exertions, trial sections were taken in every direction; from St. John's to Shediac, on the Gulf of St. Lawrence, on the east, and to St. Andrew's and the frontier of the United States, by two different

routes, on the west; and from Shediac to Miramichi, northwards. The permanent surveys, and estimates of the works, were also so far advanced, as to enable the contract for the portion from St. John's to Shediac to be made between the New Brunswick government and Messrs. Peto and Betts. Mr. Beatty then returned to England, late in the autumn, and, in the following spring, he was appointed Engineer-in-chief of the New Brunswick Railways. But on the eve of sailing, his destination was suddenly altered to Nova Scotia, where he proceeded, to explore and lay out the portion, in that province, of the great system of railways; Mr. Giles being subsequently sent to carry out the works in New Brunswick.

In Nova Scotia, as in New Brunswick, the surveys had to be made through the dense primæval forest. Through this, the different surveying parties at once proceeded literally to cut their way; often felling, within twenty, or thirty yards, half-a-dozen splendid trees, invaluable in a park in England, but sadly impeding the progress of the surveys, where they were. By Christmas, however, trial sections had been taken all over the country, the line was surveyed, and permanently staked out, over the whole extent, from Halifax to Truro, and from thence by two routes, one round and the other across the Cobequid Mountains, to the New Brunswick frontier, as well as branches from Halifax to Windsor, the direct line to St. John's, New Brunswick, and from Truro to Pictou, the route towards Prince Edward Island. During the whole of this period the various parties had been "camping out," living in the woods with a thin canvas single tent for a covering, salt pork and hard biscuit for provisions, and for the last month three feet of snow on the ground, with the thermometer down to 15° below zero. Mr. Beatty was continually moving from party to party, encouraging and stimulating all to the greatest exertion by his own example, and taking his share of the hardships of the situation.

The war with Russia broke out, at that period, and capitalists hesitated on entering into large engagements, in the then unsettled state of affairs. Accordingly, in February 1854, Mr. Beatty and his staff finally left the shores of America, carrying with him the good wishes and hearty esteem of all with whom he had come in contact.

The war, meanwhile, went on, and the allied armies were reduced to very severe straits in the winter of 1854, one of the principal difficulties, if not the greatest, being the want of land transport. It was then suggested to the Duke of Newcastle by Mr. (now Sir Morton) Peto, Assoc. Inst. C.E., to construct a railway from Balaklava to the front, which, although the ground was not favourable for an ordinary railway, would, it was presumed, be of great service in facilitating the transport of stores and ammunition. The Government having adopted the suggestion, intrusted

the whole of the arrangements to Messrs. Peto and Betts, who appointed Mr. Beatty Engineer-in-chief. After remaining a short time in England, to organize the Railway Corps, and make the necessary arrangements, he proceeded by the overland route to the Crimea, where he arrived on the 19th January 1855. Having approved of the line which had been surveyed and laid out by Mr. Donald Campbell, the Assistant Engineer, who had preceded him about four weeks, he at once applied to Lord Raglan, for such military assistance as could be spared, in order to prepare for the arrival of the navvies and the railway material. A party, varying from one hundred and fifty to two hundred men, from different regiments, was daily allotted to this duty, and was employed in converting a vacant space of ground in Balaklava, which had hitherto been in a shocking state of disorder, and filth, into a good yard, using for that purpose the debris of some ruinous old houses, and in making a solid foundation for the sleepers along the soft and muddy valley of Balaklava, with stones taken from the neighbouring walls. This assistance was continued for about ten days, until the arrival of the navvies, when the men were divided into shifts, and worked day and night, until the village of Kadikoi was reached. This was effected in about ten days from the landing of the first rails. Shot and shell were then conveyed to that distance on the railway, saving the fatigue parties who had to carry them on their backs to the front, either slung in canvas bags, or between a couple of short poles, three mules of their muddy tramp, and freeing the already overcrowded harbour of Balaklava from the presence of that number of men.

In the mean time the works were being pushed on vigorously towards the plateau; two hundred sailors were lent from the Naval Brigade for ten days, who evinced in their novel employment, the same hearty spirit and good-humoured activity which characterized all their operations, however foreign to their usual habits. In about seven weeks the Col was reached, a distance from the commencement of the railway of about four miles and a half, and at an elevation of 660 feet above the level of the sea; a branch of three-quarters of a mile to the Ordnance, or Diamond Wharf, laid; the stationary engines at Frenchman's Hill fixed and at work; and the line from Balaklava to Kadikoi made double. Stores were conveyed along the railway, simultaneously with the prosecution of the works. The remainder of the distance to the camps was comparatively level, and from the traffic being spread over a large surface, the ground was not so much cut up. The line was further extended to the Woronzoff road, between the Second and Light Divisions, with a branch winding round the rear of Cathcart's Hill, to a spot between the Third and Fourth Divisions. A branch, about three miles in length, was afterwards made from Kadikoi

towards the Sardinian camp, over the scene of the Heavy Cavalry charge, and General Della Marmora, before leaving the Crimea, expressed his sense of the service it had rendered to his corps.

During all this time whatever masons, carpenters, or others of the Railway Corps could be spared, from the more immediate railway works, were employed in building limekilns, bakeries, wharves, and huts, and in sinking wells, &c. A considerable number of the men were employed on the line as brakesmen, until the men of the Land Transport Corps, who afterwards worked the traffic, had obtained the requisite experience. By the beginning of August the term of service of the navvies had expired, and on their being sent home, Mr. Beatty was invited by Lord Panmure to remain in charge of the railway, and Mr. D. Campbell was confirmed in the post of Assistant Engineer. Pending the arrangement of a new railway department, a number of men were ordered to be detailed for service on the railway, according to Mr. Beatty's requisition, from the Army Works Corps, which had been organized and sent out from England by Sir Joseph Paxton, Assoc. Inst. C.E., under the charge of Mr. W. T. Doyne, M. Inst. C.E., as Superintendent-General. The traffic department being now entirely carried on by the Land Transport Corps, the men lent from the Army Works Corps were employed in ballasting the line, in anticipation of the coming winter, the embankments were raised, and the cuttings lowered, in order to improve the line as much as possible, the great desideratum at first having been to get it opened with the least possible delay.

Mr. Beatty's health, which had been very much affected by an accident, at last gave way, and after proceeding to Scutari for a short time, by medical advice, he was, as a last chance, finally invalided to England, for which place he left in November 1855, to the great regret of all who knew him. The proximate cause of the failure of his health was the accident previously alluded to. The 71st Regiment, quartered near Balaklava, was ordered up to work in the trenches on one occasion, and the men were conveyed to the front on mules. Lord Raglan wishing them to return by railway, the regiment was divided off into three trains, two of which went down the incline, from the Col to the stationary engine, averaging 1 in 25, in safety; but the last train, in which were Mr. Beatty and the Officers, owing to the dew on the rails, and the rapidly-increasing darkness, got too much way on it, overpowered the breaks, and went down at a fearful speed. In endeavouring to stop it Mr. Beatty was thrown out, and received internal injuries from which he never recovered.

He reached home in December 1855, and lingered in great suffering until his death, which occurred on the morning of the 11th March 1856. During this period he still retained the

liveliest interest in everything connected with the railway in the Crimea, receiving reports from his assistants, and directing them at a distance with his advice. His complaint, however, baffled the physician's skill. There was the same robust and vigorous frame, and no outward appearance of disease, until a fortnight previous to his death. Then a swelling of the throat and the left arm commenced, accompanied by difficulty of breathing, and a painful sensation of suffocation when reclining, which confirmed the belief, that the accident in the Crimea had produced aneurism. On the announcement of his impending fate being made to Mr. Beatty, he received it with Christian fortitude and resignation, and, with that energy which was his chief characteristic, proceeded to arrange his affairs.

He exhibited great energy and application in the pursuit of his profession, which seemed only to augment as difficulties presented themselves. Whenever and wherever work was to be done, he always led, and took the largest and the hardest share. His presence seemed to inspire confidence, and his constant cheerfulness acted as a powerful incentive and stimulus to those around. Frank, openhearted, and amiable in his communication with his fellow-men; upright and just in all his dealings; liberal and generous, no wonder that he was universally beloved.

He joined the Institution as an Associate in 1852, but his constant occupation abroad after that date, prevented any frequent attendance at the meetings. His early death has been a source of great regret to those who knew him best, as they had predicted for him a brilliant career.

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MR. THOMAS CUBITT was born at Buxton, near Norwich, on the 25th February, 1788. In early life he worked as a journeyman carpenter, and with a view to improve his circumstances, he made one voyage to India, as a ship-carpenter. With the savings he then made, he, on his return to London, commenced business as a master-carpenter, being at the time about twenty-one years of age. His first work, of any extent, was putting the new roof on the Russell Institution, in Great Coram-street, under the superintendence of Mr. John Shaw, then architect to Christ's Hospital, London. This was completed to the entire satisfaction of the committee and of the architect, so that when tenders were advertised for, for the building of the London Institution, in Finsbury Circus, Mr. Cubitt's offer was accepted, mainly on the recommendation of those who knew how well his work had been done at the Russell Institution. The foundations were laid in May, 1815; and, shortly afterwards, as appearances of success began to manifest themselves, he took a tract of land from Lord Calthorpe, on the east side of Gray's Inn-