

Works, where he remained till 1881, being then transferred in the same capacity to Bangor, on the construction of the Bangor and Bethesda Branch of the London and North Western Railway. In 1882 Mr. Wood resigned this appointment, and for the next couple of years he assisted in the preparation of several schemes for parliamentary deposit, and in other works of a minor description.

In October, 1884, he proceeded to India on a three years' agreement with the Great Indian Peninsula Railway Company, and held during that period the appointment of Resident Engineer at Sholapur, returning to England in February, 1888. In the following December he was appointed Resident Engineer on the Cabezas del Pasto Railway, Huelva, South Spain, which position he held at the time of his death, which occurred on the 30th of August, 1889.

Mr. Wood was elected an Associate Member of the Institution on the 7th of February, 1882. He was previously a Student, and while in that class was awarded, in 1881, a Miller Prize for a Paper on "The Holyhead Harbour Works."

Mr. Wood was of a peculiarly happy, buoyant disposition, ever ready to see the bright side of life, which, combined with a generous kindly nature, and a capacity for unswerving friendship, endeared him to all those with whom he was brought into intimate relations.

SIR JAMES FALSHAW, Bart., J.P., D.L., F.R.S.E., was born in Leeds on the 21st of March, 1810, and passed peacefully away, after a life of hard work, at the ripe age of nearly eighty years, on the 14th of June, 1889.

James Falshaw sprang from an old yeoman family, long settled in the valley of Coverdale, in the North Riding of Yorkshire. His father, William Falshaw, a wool merchant in Leeds, married Hannah Shaw, and by her he had fourteen children, of whom James was the sixth. Young Falshaw received his early instruction under Mr. Jonathan Lockwood, a local celebrity in his day, in whose establishment in Brunswick Terrace, Leeds, he was a fellow pupil of Sir John Hawkshaw, Past President Inst. C.E. In the year 1824, at the age of fourteen, he was articled for a term of seven years to Mr. Joseph Cusworth, architect and surveyor, Leeds. This gentleman appears to have been a hard master, as his pupil was wont to relate how he worked from nine o'clock in the morning until nine o'clock at night—Saturdays included—all the year round. During his apprenticeship Falshaw gave special attention to the

theory and construction of skew arches, and overcame for himself the difficulties, at a time when such work was new and not generally understood. In after life he attributed his first important advancement to his successful mastery of this subject. When his long seven years expired in 1831, the great tide of railway construction had just begun to flow, and Mr. Falshaw seems to have been caught by it immediately upon gaining his freedom. Messrs. Hamar and Pratt, contractors for the Leeds and Selby Railway, recognizing the ability and determined character of the young man, engaged him as agent in charge of a section of that line, in which capacity he served them for three years, evidently to their satisfaction, for, on the completion of the work, he was appointed to take charge for them of the construction of the Whitby and Pickering Railway, a line remarkable alike for steep gradients and for the sinuosity of its course. In this contract he acted in the multiple capacity of agent, engineer, book-keeper, and cashier, and had full charge of the works, with the assistance only of two travelling gangers. The contractors left him in entire command, and seldom visited the works, which he brought to a successful completion in the spring of 1836.

During these five years Mr. Falshaw, with his untiring energy and zeal, gained, as may be readily imagined, a thorough knowledge of railway work, and he revealed, in the responsible positions which he held, a character of sterling worth and integrity, which by no act of his in after life did he ever forfeit.

In the year 1836, at the age of twenty-six, he became principal assistant to Mr. George Leather, of Leeds, Engineer of the Aire and Calder Navigation, Goole Docks, &c. He remained with that gentleman for seven years, during which period he was engaged in preparing parliamentary- and working-plans and surveys for various schemes, many of which were successfully carried through Parliament and executed. Amongst these may be mentioned the Leeds Water-Works, for which an Act was obtained in 1837. This work consisted of a storage-reservoir 50 acres in extent at Eccup, 7 miles from Leeds; a second storage-reservoir at Weetwood; a service reservoir at Woodhouse Moor; and a tunnel, $1\frac{1}{4}$ mile long between Eccup and Weetwood. Plans of the Stockton and Hartlepool Railway were prepared in 1837, the works commenced in the following year, and completed in the spring of 1841, Mr. (now Sir John) Fowler, Past President Inst. C.E., being Resident Engineer. The chief work on this line was the construction across Greatham Marsh of a brick viaduct of ninety-two arches, the foundations of which were so bad that piles had to be driven from 30 to 60 feet

in depth. The railway works were successfully and rapidly completed, and were highly eulogized in the newspapers of the time.

The Bradford Water-Works scheme was reported on in 1838, plans prepared in 1840, the Act obtained in the following year, and the work executed in 1842 and 1844. The experience gained on these and other works stood Mr. Falshaw in good stead in after life.

In the spring of 1843 Mr. Falshaw commenced business at Leeds on his own account; but he did not, it appears, entirely sever his connection with Messrs. Leather, for a year later he was engaged with Mr. J. W. Leather and Mr. R. O. Hodgson in the opposition to the proposed valley line of the Leeds and Bradford Railway, taking levels, plotting sections, making estimates, and giving evidence before Committees of the House of Lords.

It was at this time that a turning point in his career took place. Mr. John Stephenson, of the firm of Messrs. John Stephenson and Co. (with whom were associated Mr. William Mackenzie and Mr. Thomas Brassey), offered him the charge of the construction of the Lancaster and Carlisle Railway, the contract for which, as a single line, had been taken by the firm. After due consideration, Mr. Falshaw decided to accept this offer, and the month of June, 1844, found him installed at Kendal, vigorously discharging his new duties, purchasing sleepers, inspecting quarries, and arranging terms with landowners. In the following month he was first introduced to Mr. Brassey at Carlisle, at a conference between the engineers, Messrs. Locke and Errington, and the contractors. It is worth recording that at this meeting Mr. Locke decided that "as many stone blocks were to be used as possible," which order was, curiously enough, qualified six months later by Mr. Errington. In conversation with Mr. Falshaw, Mr. Errington said, "I have no objection to sleepers being used in the district between Shap and Kendal; although Mr. Locke has an objection to them, I have not, and you may use them." Great difficulties and delays were encountered in gaining possession of the land, and these sorely tried Mr. Falshaw's patience, for he had agreed with Mr. Brassey, at a meeting of the directors in August, to finish the line in two years' time. In November, however, the Board decided to double the line, at an extra cost of £80,000. Mr. Falshaw was not destined to carry this work to completion, for in the early part of the following year, 1845, he was very busily engaged in London, with Mr. Brassey and Mr. Stephenson, making estimates for the Scottish Central, the Scottish Midland, the

Caledonian, and other important railways, and in attending Committees of the House of Commons. On one of these occasions he heard Mr. Brunel, in giving evidence in favour of the Hawick Railway, say that he "saw no difficulty in locomotives ascending gradients of 1 in 70, with $\frac{1}{4}$ mile curves at a speed of 20 or 30 miles an hour," the boldness of which statement created a profound impression upon those present.

The tender of Messrs. Stephenson, Brassey and Mackenzie for the Scottish Central and Scottish Midland Railways and the Castlecary branch of the Caledonian Railway having been accepted, it was arranged that Mr. Falshaw should conduct the operations on terms very favourable to himself. In July, 1845, he therefore removed to Stirling. The line commenced at Greenhill, where it joined the Edinburgh and Glasgow Railway, and extended to Forfar, *via* Larbert, Stirling, Dunblane, Crieff, Perth, and Cupar Angus, a total length, including branches, of over 100 miles, 70 of which were double line. The heaviest portion of the work was the Moncrieff Tunnel, 1,200 yards in length. In carrying out this important undertaking, Mr. Falshaw developed great administrative ability. He had at his command a force of eight thousand men, and the works were accordingly prosecuted with great vigour. Mr. (now Sir Charles) Hartley joined his staff in the autumn of 1845, and was placed in charge of the Dunblane district. On the 1st of March, 1848, after an inspection by Captain Wynne, the section of the Scottish Central Railway between Greenhill Junction and Stirling was publicly opened for traffic, and the remainder of the line to Perth on the 22nd of May following. Two months later the Scottish Midland Railway, from Perth to Forfar, was also opened for traffic. The entire work having been thus completed in three years, the contractors were rewarded with a substantial bonus.

On the 5th of January, 1849, a public dinner was given in Mr. Falshaw's honour at Stirling. Immediately upon the opening of the Scottish Central and Scottish Midland Railways, the directors of both companies resolved to let to Mr. Falshaw the contract for the upholding of their whole undertaking for a term of seven years. He accordingly entered upon this work on the 1st of January, 1849, and the contract terminated satisfactorily in due course in 1855. During this period he also executed many additional works in connection with these railways.

In 1851 his connection with the firm of Messrs. John Stephenson and Co. ceased. Mr. Stephenson had died in 1848, but Mr. Falshaw never lost touch with Mr. Brassey, who frequently consulted him and requested his assistance. A sincere friendship was

maintained between the two until Mr. Brassey's death in 1870. In October, 1853, they met at Shrewsbury, and agreed, upon terms of equal responsibility and 'profit, to take the contract for the construction of the Inverness and Nairn Railway, Mr. Falshaw having the entire management. He accordingly, in the following year, sold his house at Perth and settled at Nairn. The line to Nairn was opened on the 5th of November, 1855, and soon afterwards the directors agreed with Messrs. Brassey and Falshaw for its extension to Elgin, a total distance from Inverness of 37 miles. This work, which was conducted under considerable difficulties, arising from the rugged character of the country and the liability of the mountain streams suddenly to become raging torrents, was successfully completed in the spring of 1858. A few months afterwards, the line from Aberdeen was carried forward to Elgin, and the Highlands of Scotland were connected by rail for the first time with the southern portion of the kingdom.

Mr. Falshaw thoroughly enjoyed his four years' residence in the ancient town of Nairn, and his presence there appears to have been much appreciated by the inhabitants, who gave a public dinner to him in the spring of 1856, the Provost presiding. On the 4th of November in the same year, he was elected a member of the Town Council, and only three days afterwards he was unanimously elected Senior Bailie of the royal burgh. His work in the North being completed, he quitted Nairn on the 31st of August, 1858, to take up his residence in Edinburgh, bidding an affecting farewell to the friends who came in crowds to the station to take leave of him. In Edinburgh, to which beautiful city he had ever since his first visit to Scotland been greatly attached, he hoped to spend the remainder of his life in comparative ease and retirement, but his character, his capacity for work, and his great business ability were too well known to allow of his leading a quiet life. Before leaving Nairn, he had entered into contracts for the construction of the Denny branch of the Scottish Central Railway, and for the Port Patrick, Stranraer, and Glenluce Railway. These were completed in due course in the years 1859-60.

On his return to Edinburgh in January, 1861, after a tour in the United States and in Canada, he was elected without opposition to represent St. Luke's ward in the City Council, and three years afterwards, he was elected a magistrate of the city. In October 1861, he was invited to, and accepted, a seat on the board of directors of the Scottish Central Railway.

In 1862 he entered into partnership with Messrs. Morkill and Prodham, two of his former assistants, in a contract for

the construction of the Berwickshire Railway, each taking an equal share in the risk and profit of the undertaking. In 1864 he again associated himself with Messrs. Morkill and Proddham in a contract for the construction of the Blaydon and Conside branch of the North Eastern Railway in the county of Durham. The completion of this work in December, 1867, closed his career as a railway contractor.

About this time, he became a director of the Inverness and Aberdeen Junction Railway, now merged into the Highland Railway Company, and also of the Cambrian Railway Company. He was also for many years a director of the Central Bank of Scotland, which, in 1868, was amalgamated with the Bank of Scotland. This arrangement was effected at a meeting which the directors of the two companies held at Mr. Falshaw's house in Edinburgh.

In the spring of 1867, he made a prolonged tour in Italy in company with a friend, and in August of the same year, at the invitation of the Lord Provost, he accompanied the Commissioners of Northern Lights, in their steam yacht "Pharos," in one of their pleasant trips to the remote points at the extreme North and West of Scotland, visiting amongst other interesting places the lonely Island of Foula, the female section of which primitive community fled at the approach of the strangers. He was fortunate in being one of the recipients of an invitation from the Khedive of Egypt, to representatives of this country, to be present at the grand ceremonial of the inauguration of the Suez Canal in the year 1869, by the Empress Eugenie of France.

In November 1872, after an absence from the Council of five years, he was again invited to enter municipal life, and was elected by a large majority to represent St. George's Ward. In March 1874, Lord Provost Cowan retired from office, in consequence of having been elected Member of Parliament for the city, and Mr. Falshaw was unanimously chosen to fill his place *ad interim*. At the November election in the same year he was reinstalled, with acclamation, by the assembled Council in the office of Chief Magistrate of the city for the usual term of three years. It is a notable fact that he is, so far, the only Englishman who has ever occupied that position. During his tenure, Lord Provost Falshaw devoted his mind to the interests of the city, and he heartily and freely gave the benefit of his ripe experience, technical knowledge and great energy, to the advancement of the numerous important measures then engaging attention. It is chiefly to him that many of the features which add to the adornment of the city,

and not a few of the comforts of the community, owe their existence. Prominent amongst the many schemes with which he was specially identified are, the Edinburgh Water-Works, Moorfoot scheme; the acquisition of the Arboretum; the widening of Princes Street, by the annexation of a portion of the gardens, thus making it probably the finest street in Europe; the roofing of the Waverley Market, which had the double effect of enhancing the efficiency of the market and blotting out an eyesore; the widening of the North Bridge, and the opening to the public of the West Princes Street Gardens, formerly private property. All these reforms and improvements he saw carried out, and they are undoubtedly of the greatest advantage to the city. His high professional skill was of the utmost service in carrying out the Moorfoot water scheme. "His bearing in the council-chamber was notable in that he pierced to the heart of a subject, made no long-winded speeches, but pronounced a dogmatic but wise opinion in a few forcible words." Accustomed himself to deeds, not words, he was impatient of unnecessary talking on the part of others; it is no wonder, then, that the business at the council meetings during his tenure of office was transacted in about half the usual time. His action in urging forward and helping to carry out the Scottish National Memorial to the Prince Consort is specially memorable, and it was universally admitted that he got no more than his reward in the baronetcy which the Queen conferred upon him. This event took place on the 17th of August, 1876, when Her Majesty visited Edinburgh.

At the close of his municipal career, which terminated with his Lord Provostship in November 1877, Sir James was publicly presented with a valuable testimonial, consisting of a life-sized portrait of himself, subscribed for by his fellow-citizens as a mark of their esteem and appreciation of his services, and at the same time, Lady Falshaw was presented with a diamond bracelet and ring. Prior to his death, Sir James presented the portrait to the Council, and it now hangs in the Council-chamber.

In February 1875, when he was busily engaged with city affairs, Sir James received and accepted an invitation to a seat on the Board of Directors of the North British Railway Company. At that time the building of the unfortunate Tay Bridge, designed by Sir Thomas Bouch, was already in progress, and Sir James took in this work, as in everything with which he was connected, a conscientious interest. The terrible accident which befel the structure, in December 1879, was a great shock to him; but it is interesting to note that the directors, who were hurriedly assembled

to consider the matter only two days after the occurrence, boldly resolved before they parted to rebuild the bridge.

A new Bill was obtained in the spring of 1881, and a contract was made in October of the same year with Mr. William Arrol, to carry out a new design, prepared by Messrs. Barlow and Son, for the sum of £615,000. The new bridge, which carries a double line, was most successfully finished and opened in May 1887.

In March 1881, Sir James was elected Deputy-Chairman of the North British Railway Company, and in August of the same year, he became Chairman of the Forth Bridge Company, provisionally formed to carry out the design of Messrs. Fowler and Baker. When the board of this important company was finally formed in July 1882, it was composed, besides the North British representatives, of the Chairmen of the three great English railways, viz., the Great Northern, the Midland and the North Eastern, who had joined in the promotion of this gigantic undertaking, and at the first meeting, Sir James was re-elected Chairman of the Company. He saw the Bill successfully carried through Parliament, the work fairly launched in progress and almost completed. The contract was let to Messrs. Tancred, Arrol and Co., in November 1882 for the sum of £1,600,000. Sir James took an absorbing interest in this great work from the time of its inception until his death.

In the month of August 1882, on the decease of Mr. John Stirling, the Chairman of the North British Railway, Sir James was unanimously elected to fill his place, and he continued to preside over the affairs of the company until January 1887, when, owing to advancing age, he felt the need of repose. He accordingly retired in favour of the Marquis of Tweeddale. The directors, however, were desirous of retaining his services, and the Deputy-Chairman, Mr. Beaumont, resigned in order that Sir James might take his place. In connection with the North British Company, Sir James was also on the Boards of the City of Glasgow Union Railway, the Edinburgh Suburban Railway, the Bo'ness Harbour Commission, the Burntisland Dock Commission, and numerous committees. He was also for some years Convener of the Works Committee of the Edinburgh and District Water Trust, Chairman of the Works Committee of the Leith Dock Commission, a Curator of Edinburgh University, and a Governor of the Royal Infirmary. In the year 1880, he filled the important public office of Master of the Merchant Company, a body of great wealth and influence in Edinburgh, which controls extensive estates and several of the famous educational hospitals of the Scottish capital. Sir James was also on the Boards of various manufacturing, shipping and

insurance companies. In fact, positions of trust and honour fell to him as the natural result of ability and integrity; but for the last year or two of his life, he was unable to take an active part in his affairs, as his health and strength were failing. The *Glasgow Herald* of the 15th of June, 1889, says:—

“Sir James was quite noted in Edinburgh as a Chairman of meetings. Naturally a man of few words, when anything had to be done, his speeches were marked with a directness and brevity seldom to be met with. He was opposed to needless speech-making on the part of others, and always endeavoured to bring matters to a point as speedily as possible. Though this aspect of his character made him appear rather ‘short’ and ‘gruff,’ it was only a sign of the sterling purposeful mind. In private he showed his genial kindly disposition, while his work remains to testify, not only to his business capacity, but to his love of his fellow-men.”

The *Scotsman* of the same date, says:—

“He was a man of indomitable energy and firm purpose. Outwardly of a brusque demeanour, and inwardly possessed of a swift mental way of arriving at the heart of things, he was impatient of public palaver, and his laconic methods of conducting council and railway meetings occasionally staggered the advocates of liberty of speech. The white rose of his crest was a fitting symbol of a life of sterling integrity, and his motto ‘*In officio impavidus*,’ a very pithy way of expressing his conduct in public life.”

Sir James Falshaw was elected an Associate of the Institution on the 23rd of May, 1854.

JAMES GRIERSON was born at Edinburgh on the 10th of October, 1827. His father, who was early engaged on engineering and building operations, subsequently removed to Birkenhead, as a member of the engineering staff of the Chester and Birkenhead Railway. At this place young Grierson finished his schooling, and in 1843 he entered the office of Messrs. Dickson and Yarrow, the Chief Engineers of the line, upon the construction of which his father was employed. His career here was nearly nipped in the bud, for after a short time he was, apparently without rhyme or reason, sent home. His father, greatly distressed, wrote to Mr. Dickson, inquiring if the dismissal were due to “any dishonesty or untruthfulness.” The reply was to the effect that it was “neither for dishonesty nor for untruthfulness, but for sheer wilful waste.” It eventually turned out that young Grierson had taken a whole clean sheet of paper whereon to write the name of a caller.