

To the Institution of Civil Engineers Dean Buckland was specially devoted; he looked upon the labours of its Members as inseparable from geological research, and he rarely missed the reading of any paper of importance, taking an active part in the discussion, and whenever his personal aid or influence could be useful, it was most cheerfully given.

The same qualities which pervaded his public career governed his private life, and he was never so happy as when he was surrounded by his family and friends, by whom he was equally admired and loved. His kindness was unbounded; and when his useful career was arrested, his absence was felt as that of the intimate friend and companion of all. He suffered for some years from a diseased state of the bones at the base of the skull, which led to the partial impairment of his mental faculties. During his illness he was most carefully watched by his excellent and amiable wife, and by his eldest son, Assistant-Surgeon to the Second Regiment of Life Guards, and on the 15th of August 1856, he was taken from his family and a large circle of friends, by whom his memory will ever be cherished, with the most vivid feelings of affection.

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MR. MICHAEL ANDREWS BORTHWICK was born at Dunbar, in East Lothian, on the 30th of October, 1810. He received the rudiments of his education under Mr. White, of Dunbar, then a man of considerable reputation as a country teacher, and under whom he made rapid progress. He afterwards completed his studies at the Academy of the ancient burgh of Ayr, at that time, and still, one of the most famous provincial seminaries of Scotland. The Rev. Dr. Memes, a well-known scholar, author, and man of science, was Rector, and took a deep interest in his young pupil, whose constant and indefatigable exertions for learning very soon eclipsed all the other scholars, many of them of a much greater age. Dr. Memes recently assured an old and intimate friend, with pride, that he was astonished at the perfection his former pupil had attained in so short a period. He devoted much attention to mathematics, but he was chiefly distinguished in English composition, and in his knowledge of History and Geography. His memory on almost all subjects was most minute and comprehensive.

The following testimonial from Dr. Memes was given to him on quitting the academy:—

“It is with more than ordinary satisfaction that I discharge, not merely an official duty, but a highly pleasing service, in granting this public attestation in favour of the amiable disposition, persevering industry, and superior talents and acquirements of my

young friend Mr. Michael Andrews Borthwick. From the commencement of his studies in this Institution, under my direction, Mr. Borthwick was distinguished in a very eminent degree, in a class, every member of which was at least respectable for ability and application. I could likewise observe no inconsiderable proof in him of merit, united with goodness of heart, and that this superiority was cheerfully acknowledged by his fellow-students, who seemed equally to respect his acquirements and to love the excellence of his character.

“With regard to the nature and extent of Mr. Borthwick’s attainments, these will be found rarely equalled, and seldom, if ever, surpassed, by any one of his standing. As a student in the Rector’s Classes in this Seminary, his studies were directed chiefly to Mathematical and Physical Science, and to Geography. In the two first-mentioned departments his merits were so conspicuous, that did I not know from the reports from the masters, and from his having obtained the first rewards in every other class, as also from my own observation, that Mr. Borthwick has most diligently and successfully cultivated other studies, especially languages, I should say, that his genius eminently qualified him to excel in the pursuits of Mathematics and Natural Philosophy. In each of these branches, especially the former, he has already made a progress far beyond his years, and has even carried his studies in Geometry and Analysis to a height seldom attempted out of a University. In Geography his diligence and success were sufficiently apparent from his receiving the first prize-medal in the senior division of a numerous class; and I may add to this, that I seldom failed to receive an answer to questions not resolved by any other of his compeers, while several voluntary essays on Physical Geography did great credit to his acuteness and extent of information.

“Expressing my sentiments thus warmly, it is unnecessary to add, that I consider Mr. Borthwick to be a young gentleman deserving of every encouragement; and that he will form an ornament to any profession in which eminent talents, unwearied industry, very considerable and varied attainments, inflexible integrity, and great docility are requisite. I express my conviction also, that he will prove an invaluable assistant to those under whom he may be employed, especially in any scientific capacity.

“If to this public testimonial, my own private feelings can add any weight, I would say that I shall never cease to feel a warm and personal interest in his happiness and success; and that it will ever afford me the most sincere satisfaction to be informed of his prosperity and welfare in life.

(Signed) “J. L. MEMES, LL.D.,  
“Rector of Ayr Academy.

“Academy, Ayr, Nov. 14th, 1826.”

Mr. Borthwick came to London in the beginning of October 1827, where, after a short interval, he was engaged as an assistant by Mr. Walker (M. Inst. C.E.), then residing at Limehouse, and in his employment he continued for a period of eleven years. During that time he had an opportunity of seeing, and of being engaged in a great variety of important works. Among others may be mentioned: the Lighthouse at the Needles, the renovation of Blackfriars and the alteration of Westminster Bridges, the completion of Plymouth Breakwater, the embankment of the Thames at the Houses of Parliament, the construction of the Hull Docks, and the important works in the Harbours of Glasgow, Belfast, Dover, and Leith.

Whilst acting generally as Mr. Walker's private Secretary, Mr. Borthwick had an opportunity of gaining a knowledge of general business—a most essential element in all professions, not unfrequently neglected; and, enjoying the confidence of Mr. Walker, he had the advantage of constantly meeting numerous official men and others high in rank and importance. From this association he derived great benefit, and he always gratefully acknowledged the kindness which had been thus shown him.

Early in the year 1833, he became an Associate of the Institution, and in 1845 he was transferred to the class of Members. He was indirectly connected with the Institution from a very early period, took a deep interest in its progress, and bestowed great time, research, and labour in editing the first volume of its Transactions, which was got up mainly through his exertions; all the articles in it underwent his anxious revision, while many of them were actually rewritten, and the Introduction was entirely furnished by him. He also contributed a Memoir, which appeared in this volume, "On the use of Cast-Iron in Piling, particularly at the Brunswick Wharf, Blackwall." In this Paper he gave a short sketch of the introduction and use of cast-iron in piling, and described, in detail, the works at the Brunswick Pier, which were executed under the superintendence of Mr. G. P. Bidder, V.P., Messrs. Walker and Burges being the Engineers. For this communication he received a Telford Medal; and his services to the Institution were officially acknowledged by Mr. T. Webster, Secretary, by order of the Council:—

" March 15, 1837.

" I am also directed to convey to you the thanks of the Council, for the zeal with which you have laboured to render the volume of the Transactions so worthy of the body from which it emanates. The Council were not aware of the great exertions which you had made in procuring materials for the Introduction, and of the labour

<sup>1</sup> *Vide* Trans. Inst. C. E., vol. i. pp. 195-205.

which you had bestowed in superintending the volume during its progress through the press, till the President (Mr. Walker) mentioned them on the last evening. Your opportune and valuable assistance most certainly entitles you to the warmest thanks of every member and well-wisher of the Institution; and I trust that some more public acknowledgement will, ere long, be made of the essential services which you have rendered."

During this period Mr. Borthwick employed his leisure hours in contributing largely to several useful publications in London, embracing a variety of subjects, not exclusively professional. He also took much interest in the framing of the Standing Orders of Parliament in relation to engineering practice, of which a great portion were adopted from his suggestions; and, from the parliamentary and legal knowledge which he acquired in Mr. Walker's office, he eventually became a most useful auxiliary in the framing of engineering clauses, and in carrying Bills through Parliament. His varied knowledge, his quick intuitive perception and forethought, and his excellent memory, rendered him extremely useful in cases of this nature.

When railways were becoming the leading engineering feature of the day, Mr. Borthwick naturally turned his attention in that direction; and in the year 1837, Mr. Walker becoming the Engineer-in-chief of the Northern and Eastern Railway, Mr. Borthwick was appointed the Resident Engineer, and afterwards the Manager, of the line. It was opened at first as a single line for a distance of twenty-two miles; and, notwithstanding the numerous stations and the comparatively great passenger traffic, the working was conducted without a single accident. At that time the opening and management of a single passenger line was comparatively a novelty in this country, and the electric telegraph, now so essential in the working of railways, had not then been introduced.

Owing to a change of policy in the direction, Mr. Walker resigned his office as Engineer of the line, and it was confided to the charge of Mr. Robert Stephenson, M.P., President, by whom Mr. Borthwick was continued in his position as Resident Engineer.

Since that time (1839) Mr. Borthwick was constantly engaged along with Mr. Stephenson, in the construction of extensive railway and other works, including the completion of the Northern and Eastern Line to Cambridge, and its extension to Brandon, with branches to Peterborough, St. Ives, and Wisbeach; also to Enfield and Edmonton, Maldon, Witham, and Braintree, Shelford, and Shepreth, with the Newmarket and other Railways. Some idea of the extent of his labours may be formed, from the fact of no less than twenty-two sets of plans and sections of several hundred miles of railway and other works being got up and deposited under his direction, in the memorable year 1845-6. In all these cases he

was constantly engaged, during the progress of the Bills through Parliament; and he took a leading part in the opposition to the London and York and Great Northern Railways (which afterwards merged under the latter title), the proceedings in which continued for two sessions, and occupied the unprecedented period of more than seventy-five days, during which the greatest efforts of labour, skill, and judgment were constantly in requisition.

Mr. Borthwick was afterwards engaged along with Mr. Stephenson in carrying out the Egyptian Railway between Alexandria and Cairo, the first of those undertakings which are likely to be of so much benefit, in facilitating the intercourse between Europe and our Eastern possessions. In the progress of the work he made many visits to Egypt, some of them with Mr. Stephenson, during which he conducted, and assisted in conducting, complicated negotiations with great tact and ability. In these visits he acquired the respect of the authorities, and the friendship of many gentlemen of rank and distinction, whom he accidentally met on his journeys in the East.

For some years Mr. Borthwick was associated with Mr. Stephenson, the late Mr. Tycho Wing, and Mr. Robert Mein, in improvements connected with the drainage works of the Fens, and his management of those complicated and difficult matters, which had been previously in the hands of various Engineers of high standing, gained him the approbation and confidence of the Duke of Bedford and other noblemen and gentlemen interested. He was also associated with Sir John Rennie and Mr. Stephenson in carrying out the Norfolk Estuary Scheme, combining drainage and navigation with the reclamation of land from the sea, a work of great importance; and he was, to some extent, connected with the Netherlands' Land Inclosure Works, which he inspected along with his friend Mr. Bidder, V.P., with whom he was concerned in several other considerable works.

In 1853, Mr. Borthwick went out as Engineer-in-Chief to the Brazils, to report upon and fix the course of a proposed line of Railway from Pernambuco to Paulo Affonso, on the river San Francisco, on which he wrote a very able Report; and it was on his again visiting Brazil, in connection with this undertaking, that he was carried off in the prime of life, in the midst of his professional career.

He left London on the 9th May, 1856, and shortly afterwards, during the passage, was seized with illness of a typhoid character, which continued until his arrival at Pernambuco on the 27th of the same month. His death occurred on the 3rd June following, in the house of his friend, Mr. J. Scott Tucker, the Resident Engineer of the Railway by whom, as by his faithful and long-attached servant, everything was done, that devotion could prompt, to soothe his last moments.

Throughout his career Mr. Borthwick exhibited mental attainments of no ordinary kind, combined with great energy, indefatigable industry, and judicious application of these powers. He had acquired great theoretical and practical knowledge. His numerous avocations constantly brought him into contact with men of high position in the several professions, as well as with distinguished persons of all classes, from whom he did not fail to acquire useful knowledge and experience; and, from his great resources and the ready use of his powers, his society and advice were much courted. In any disputed question, whether professional, or otherwise, he was always prepared, and as to past and current events, men and things, dates and epochs, and on subjects of almost every description, his knowledge rarely failed. He had high feelings of honour and integrity, and was much esteemed by his professional brethren. He was a warm and attached friend to many, who will greatly feel his loss; and he was a most affectionate, dutiful, and generous son and brother. The bereavement to his aged and respected mother and his surviving brother and sister is indeed very severe, and they will meet with the deep sympathy of every friend.

He was a regular attendant at the meetings of the Institution, frequently taking part in the discussions, and always displaying great anxiety for the welfare of the Society.

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**MR. JAMES BREMNER** was born on the 25th September 1784, at Keiss, parish of Wick, county of Caithness, and was the youngest of a family of nine children, six of whom died in infancy. His Father was a man of great physical strength, uncommon energy of character, and high moral principle, who exerted considerable influence in the district, till his death, which took place at an advanced age, after a prolonged service in the defence of his country. During the absence of the Father on foreign service, young James was with his mother at Keiss, and obtained such an education as her means afforded. He left school at about the age of fourteen, and then had a robust constitution, with a good deal of the rover and adventurer about him. Among the crags and rocks of the district, none were half so venturous; fear was not in his vocabulary; and on one occasion he was found paddling himself through Sinclair's Bay, sitting in the bottom of a large tub! This characteristic determination lasted him through life, and when in his prime, he is believed not to have known what the sensation of fear was. The temporary settlement of his Father at Fort George, took young Bremner there, at the age of fifteen. Here he became a favourite with Colonel Macdowal, who one day asked him whether he would like to join the army, or the navy; to which