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Thomas Sopwith (1803–1879): Civil and Mining Engineer A Brief Biography

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THOMAS Sopwith (fig. 1) was born on 3 January 1803 and was baptized in All Saints Church, Newcastle, five days later. His father was Jacob Sopwith, a cabinet maker in the town and his mother Isabella Lowes, the daughter of Matthew Lowes, a methodist preacher, also of Newcastle.¹

Sopwith was educated at private schools in Gateshead and Newcastle and, on leaving school, was apprenticed to his father, remaining in his employment until reaching the age of 21. He was then allowed to leave the substantial family business and study under Joseph

Dickinson, of Alston, then employed on survey work relating to lead-mining. Before this time, however, Sopwith's interests in drawing and architecture had made themselves apparent in that, in spite of long hours in the joinery works, he was able in 1822 to produce drawings for a new gaol in Newcastle, augmenting them by models; for his efforts he was paid ten guineas.² It would seem that in spite of his youth he was asked to undertake work for the Corporation, in 1824 being paid for surveys and plans. It was also when serving his apprenticeship that he began to write his diary, a work which he continued for 58 years.³

Before taking up residence in Alston Sopwith had, in 1823, been made a freeman of the town of Newcastle and had produced a set of drawings of All Saints Church, a procedure he was to replicate for the church at Whitfield. After his first year at Alston he was made a partner by Dickinson, receiving one-third of the profits of the business; the partnership continued for four years. While at Alston, Sopwith married Mary Dickinson, daughter of Thomas Dickinson, in September 1828, a marriage of short duration as she died in July 1829, soon after giving birth to a son, Jacob. In February 1831 Sopwith remarried, his new wife being Jane Scott of Belford; their marriage of 24 years brought nine children.⁴

At the time of his marriage, Sopwith's career came to change course in that his interests turned to civil engineering, his practice based in Newcastle with, later, an office in the Royal Arcade. He undertook survey work for several of the area's landowners and was also responsible for the setting out of the road from Newcastle to Otterburn, completed in 1833. He also surveyed a line for a road along the river Derwent from Axwell Park to Ebchester;



Fig. 1 Thomas Sopwith (1803–79).
[B. W. Richardson, *Thomas Sopwith; with excerpts from his diary of fifty-five years* (1891).]

it was later built but it is uncertain if its alignment was Sopwith's. By 1832 Sopwith was involved with Richard Grainger on the design of the "new town" proposed by the latter following his purchase of the Elswick estate, in Newcastle.⁵ Grainger envisaged its development as taking place in a manner similar to that which had been adopted at Edinburgh and, as a result, anticipated providing a fully serviced development, complete with roads, water supply and sewage disposal, matters which may have been worked on by Sopwith, whose interest in public health is evidenced that year by his preparation of a report on cholera, then present in England for the first time.

Sopwith also became involved at about this time with the geology of the Forest of Dean, his introduction to it being through John Buddle, then Viewer to Lord Londonderry, and his interest in this subject was continued with his association with William Smith⁶, one of the country's leading stratigraphers and responsible for the geological investigations which led to the winning of Hetton colliery and the subsequent development of the east Durham coalfield.

In 1833 Sopwith became a member of the Institution of Civil Engineers, his name having been put forward by Thomas Telford, George Turnbull and John Buddle.⁷ His interests in drawing and geology continued but he was involved, too, in work on the region's railways, surveying a line from Blaydon to Hebburn, perhaps being involved on the Newcastle and Carlisle line, surveying a line for the Durham Junction Railway in 1833⁸—for which railway he also gave evidence at a Parliamentary Committee the following year—and carrying out survey work for the Great North of England Railway in 1835. He also gave evidence on behalf of the promoters of the London and Brighton Railway in 1837. His association with Grainger continued in the proposal to form a "central" station in Newcastle (fig. 2). The plan was to concentrate all railways south of the river and carry them into Newcastle by a single bridge before running to a station—located in Grainger's new town—which would

serve all railways.⁹ It was perhaps this plan of 1836 which led to the provision of the town's Central Station some years later.

The British Association for the Advancement of Science held its 1838 meeting in Newcastle, an event which must have brought much pleasure to Sopwith. Not only was he able to meet with men having interests similar to his but he was able to propound his views and was responsible for six of the papers presented, among them geological subjects. After this meeting Sopwith was instrumental in inducing the government to found the Mining Record Office so that geological knowledge could more easily be disseminated. Although he was still involved with railway work—for example with George Stephenson on the Sambre and Meuse Railway—his interests would seem from this time to have turned away from the mainstream of civil engineering. He developed further his work on geological models, presenting examples covering the Forest of Dean and Gloucestershire, where he was involved as a commissioner from 1833 until 1846; it was for a paper¹⁰ on this subject to the Institution of Civil Engineers in 1841 that he was awarded the Telford Medal the following year.

Although he had participated in the 1834 Bill for the establishment of the Newcastle Subscription Water Company, it was in 1843 that Sopwith became seriously involved in the public health movement which had been largely initiated by Edwin Chadwick. In Newcastle, a committee was formed to investigate the living conditions of the town's inhabitants and it was later expanded into a Health of Towns committee under the aegis of Dr. Robert Reid who visited the town, inspected it and produced a damning report on its condition, a state not unique to Newcastle but replicated throughout the country. Not only did Sopwith make his Royal Arcade office available to the committee but he chaired the Geological, Sewage and Drainage subcommittee; it was this event, perhaps, which came to be responsible for the formation of a new water company in Newcastle.¹¹

The Whittle Dean Water Company was

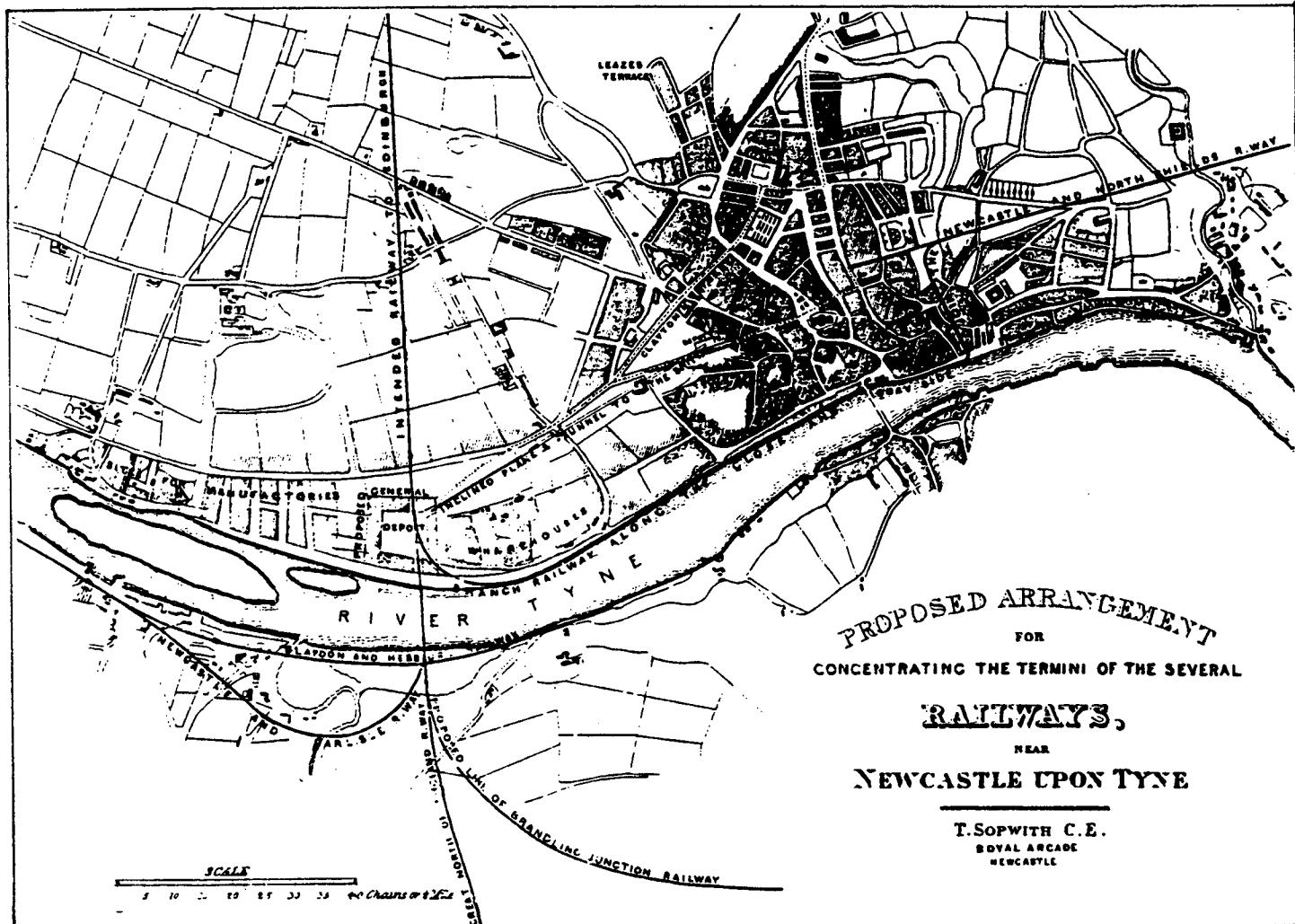


Fig. 2 A suggested concentration of railways in Newcastle, by Sopwith and Grainger.
[R. Grainger, A proposal for concentrating the termini of the several Railways near Newcastle . . . (1836).]

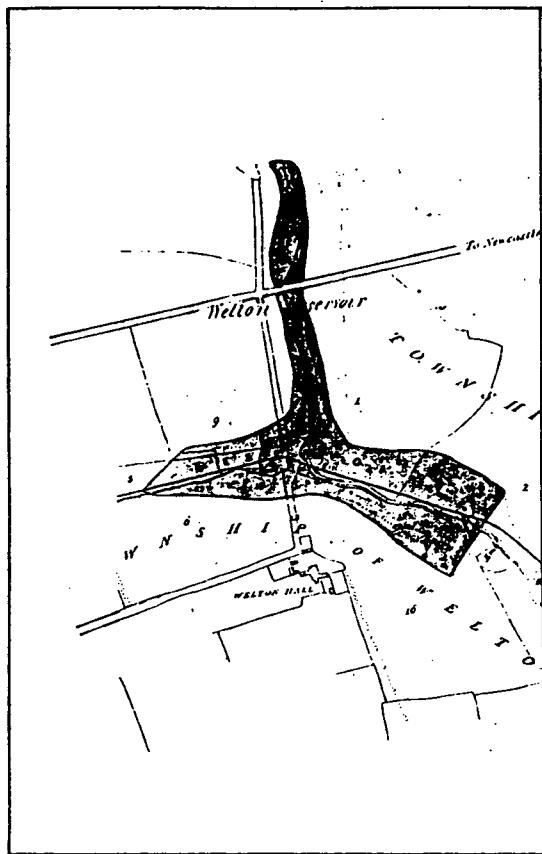


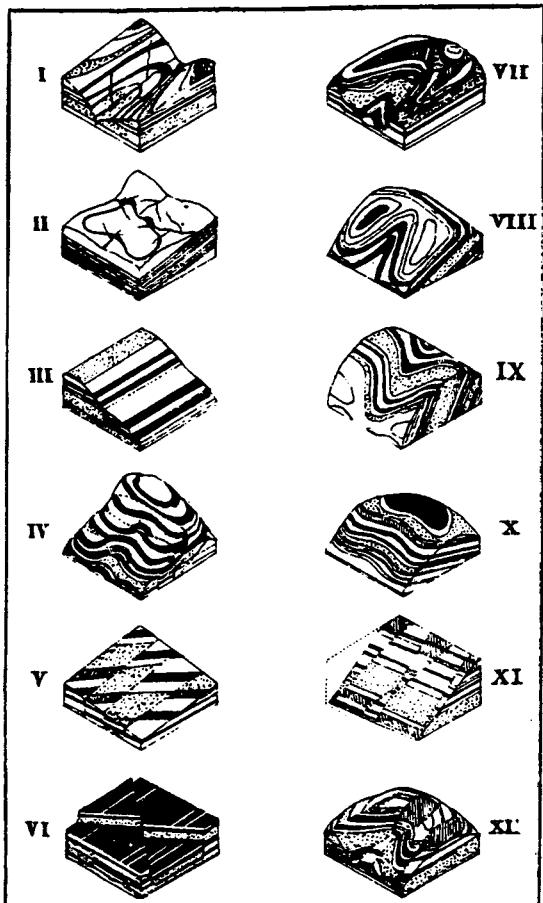
Fig. 3 Reservoir proposed at Whittle Dean, 1844: the design was later amended by James Simpson. [Newcomen Society; Transactions, 54, 1982-83.]

largely the brainchild of three men, William George Armstrong, Grainger and Sopwith. The company's plan was to form a reservoir at Whittle Dean (fig. 3), some twelve miles to the west of the town, and from it convey a supply of water to the towns of Newcastle and Gateshead, hitherto dependent on much poorer sources, including the river Tyne at Elswick. Sopwith was responsible for the engineering aspects of the work and under him surveying work was initiated, Sopwith in 1845 writing of his "assistants Bewick and Dinning ... now surveying the district and the numerous red flags and chainmen etc. (giving) a sort

of military aspect to the peaceful fields where, fifteen hundred years ago, the Roman legions"¹² had built their wall. It is of interest to note that the levelling undertaken for the works was, in the era before the establishment of the Ordnance Survey, related to the top step of the entrance to Newcastle's Literary and Philosophical Society, an establishment dear to the hearts of both Sopwith and Armstrong. An Act of Parliament was obtained for the formation of the new company in 1845 and, following immediately, Sopwith abandoned his practice in Newcastle and took up residence at Allenheads as Agent to the Blackett-Beaumont lead mines there, a marked change in direction of his activities.

The change in Sopwith's career is perhaps surprising in that it would appear that he chose to dissociate himself from what would seem to have been a reasonably lucrative civil engineering practice in Newcastle. The break, however, was not complete. When taking up his appointment at Allenheads Sopwith had agreed with Thomas Wentworth Beaumont that one quarter of his time could be devoted to other activities and, as a result, a partnership was established with his brother-in-law Marcus Scott and with T. McDougal Smith whereby Sopwith's engineering practice would be continued. Smith and Scott were to be salaried and Sopwith was to receive a third share of the profits.¹³ It would seem that Smith had been already associated with Sopwith in 1844, a practice then operating from an office in the Royal Arcade, Newcastle.¹⁴ Such were his abilities—and his relations with Armstrong—that it was said that he could have become a partner in the latter's engineering works at Elswick,¹⁵ founded in 1847, and the association would appear to have endured in that, in 1849 he still held shares jointly with Armstrong in the Whittle Dean Water Company, in which company Sopwith could perhaps have been associated as its Engineer.

In 1845, Sopwith was elected a Fellow of the Royal Society. His election was probably due to William Buckland, the geologist with whom Sopwith had worked, and among his sponsors were Sir Roderick Murchison and Sir John



GEOLOGICAL MODELS BY T. SOPWITH.

*Fig. 4 Illustration of the geological models made by Sopwith.
[T. Sopwith, Description of a Series of Geological Models ... (1834).]*

Rennie.¹⁶ His election, as might be expected, was for his work on the use of models in geological interpretation (fig. 4). Sopwith's election was to continue his friendship with Armstrong who was himself elected to the Society the following year, principally for experiments on the "electricity of steam; and the hydro-electric machine".¹⁷ Four of Armstrong's sponsors had supported Sopwith too, while Sopwith himself, another of Armstrong's sponsors, had been involved with Armstrong's

work from as early as 1839 when he had participated in experiments then in hand.¹⁸

During the early years of his appointment at Allenheads Sopwith served on the Council of the Institution of Civil Engineers, attending meetings in London and taking part in discussions on papers. The decision to take on the appointment with the W. B. Lead Mines would seem to have been due, at least in part, to the opportunity it gave him to have built for his use a substantial house at Allenheads, leading to some acrimony between him and Beaumont, who had not envisaged such a grand establishment. The dispute was not long-lasting and Sopwith soon immersed himself in the day-to-day running of the mines. In addition to the technical aspects of the work, he also spent a great deal of time on welfare matters and although he ran a very strict regime so far as staff were concerned, nevertheless he was responsible for persuading the Beaumont family to build four schools, at Allenheads, Carrshield, Brideshill and Newhouse. Those attending were charged sixpence a month and found their own books; all other costs were met by the Beaumonts. Between 1850 and 1860 he established libraries at Allenheads, Allenmill, Coalcleugh and in Weardale.¹⁹

The association with Armstrong continued during Sopwith's time at Allenheads where hydraulic engines manufactured by Armstrong were installed in the mines. The rotary engines, with oscillating cylinders, were used for winding, crushing and for machinery on the dressing floors and in the workshops. Rock drills were also introduced by Sopwith by "the express desire of Mr. Beaumont (but, not convinced by them, he wrote that) it is better to adopt the completed and successful inventions than to institute ... experimental researches".²⁰ It has been noted, however, that almost all improvements in the northern ore-field "were originated by the (rival) London Lead Company, and even inventions made by Beaumont employees were sometimes purchased by (that company) for their use, when Beaumonts did not take them up".²¹ In spite of this partial reluctance to innovate, the W. B. Mines prospered and the workforce of some

2000 people saw their housing improved and arrangements introduced for their education and wellbeing.

In 1855 Sopwith's second wife died and two years later he removed himself from Allenheads, but not before his connection with Armstrong had been continued both when his son, Thomas, was apprenticed to Armstrong in 1854²² and when the latter's new design of gun was tested at Allenheads in 1856. He now took up the post of principal Agent in London for the W. B. Mines and soon afterwards, in 1858, again married. This marriage was to Armstrong's cousin, Anne Potter, her father the first chairman of the Whittle Dean Water Company, and the ceremony took place in St. Nicholas's church in Newcastle, Sopwith travelling to the ceremony with Armstrong. His address was then given as being in Paddington.²³

Following his move to London, it would appear that Sopwith, now 55, had lost some of the creativity of his earlier years, although he did continue to publish his writings and maintain his interest in various societies. At that time he was a member of 12 London-based societies and 14 provincial, the latter including the Society of Antiquaries, the Literary and Philosophical Society, the Natural History Society and the Mining Institute. His writings, however, were now descriptive rather than scientific and covered subjects such as education and notes on his travels, including visits to Switzerland, France, Spain and central Europe; his account of a visit to Egypt with Robert Stephenson on the latter's yacht was also published.²⁴ He continued his connection with the British Association and when it again met in Newcastle in 1863 he was one of the secretaries of the geological section and again contributed papers.²⁵

Sopwith retired both from his employment with the W. B. Mines and as a practising engineer in March 1871 but not before the formation of a railway company—of which he was a director—to build a line from Hexham to Allendale. The line was completed by his former assistant, Thomas John Bewick, in 1869. On his retirement a purported 1621 employees

and friends subscribed to a testimonial to him, thanking him as one who had made improvements to the working conditions of his employees, as a philanthropist and as a scholar. Sopwith enjoyed several years in retirement, in good health until a few months before his death on 16 January 1879 at his house in Victoria Street, London.

In addition to his having managed the mines at Allenheads and having practised as a civil engineer, Sopwith had written widely during his career. He published a book on isometric projections in drawing²⁶ (fig. 5), another on the mining district of Alston,²⁷ and papers on surveying and geological matters, in addition to welfare and education. He had also written on the need for the preservation of mining records.²⁸ He had been an examiner to the University of Durham and, as a reward for his services, he was awarded an honorary M.A. in 1857.²⁹ Sopwith was perhaps the most academically inclined of the region's civil engineers and it is this which makes difficult an assessment of his achievements.

When compared with men such as Armstrong and the Stephensons—with all of whom he enjoyed a lasting friendship—and with the region's mining engineers, Sopwith played a relatively minor role in the development of the North East, although he did bring a measure of prosperity to the W. B. Mines, maintaining their output at some 10 000 tons per annum in spite of it having been thought in 1845 that they were almost exhausted.³⁰ As a civil engineer, his contribution to the economy of the region was not great as he had been employed in that profession principally as a young man and then mainly in a minor role. He had, however, written widely on both theoretical and practical matters and it is here that his greatest contributions were made, especially regarding geological sections and stratigraphy. His work on drawing and on the use of an improved levelling staff, or stave³¹—in form used up to the present day—was significant in both the surveying and engineering professions (fig. 6). The fact that he was involved in public health matters should not be overlooked and although better water supplies would have

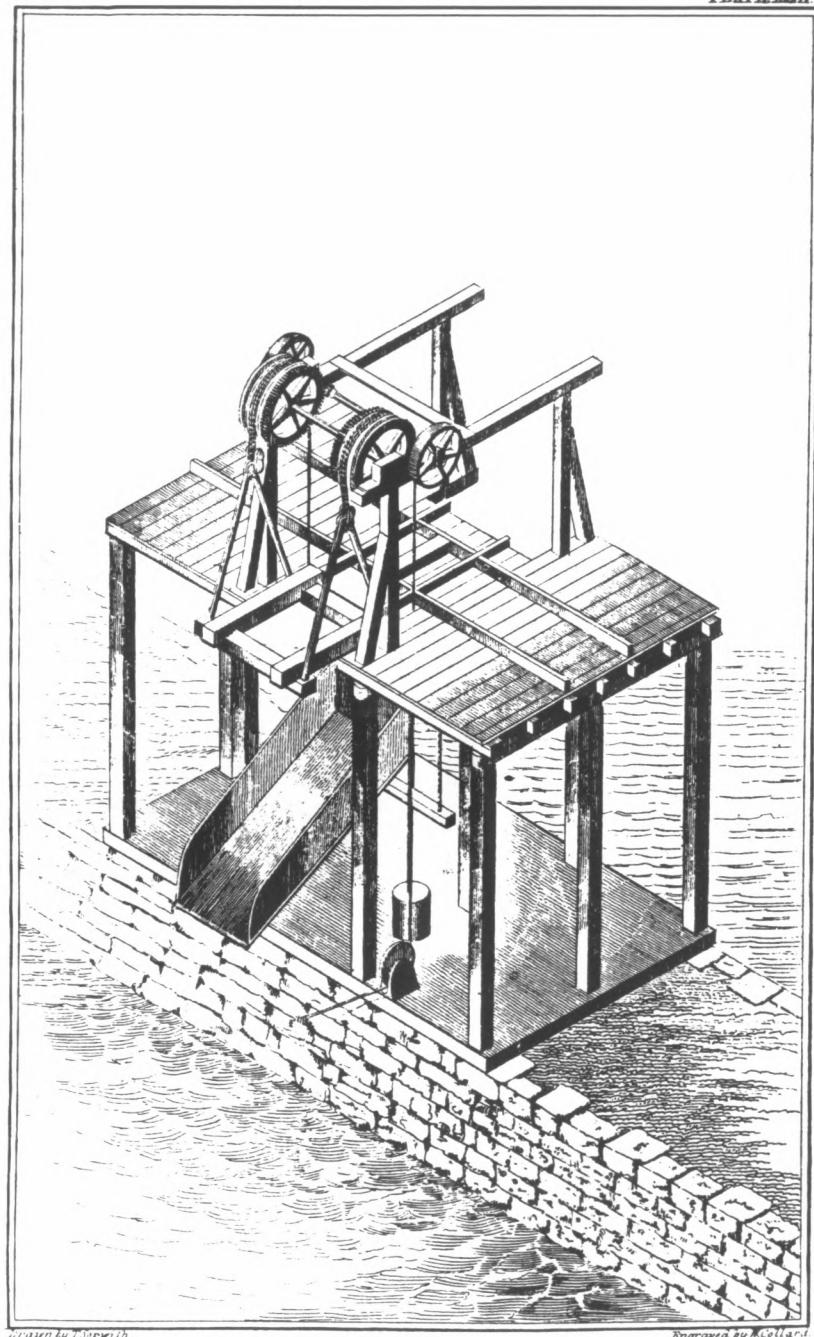


Fig. 5 Example of isometric drawing: the illustration shows coal drops at Seaham Harbour.
[T. Sopwith, *Treatise on Isometrical Drawing* (1834).]

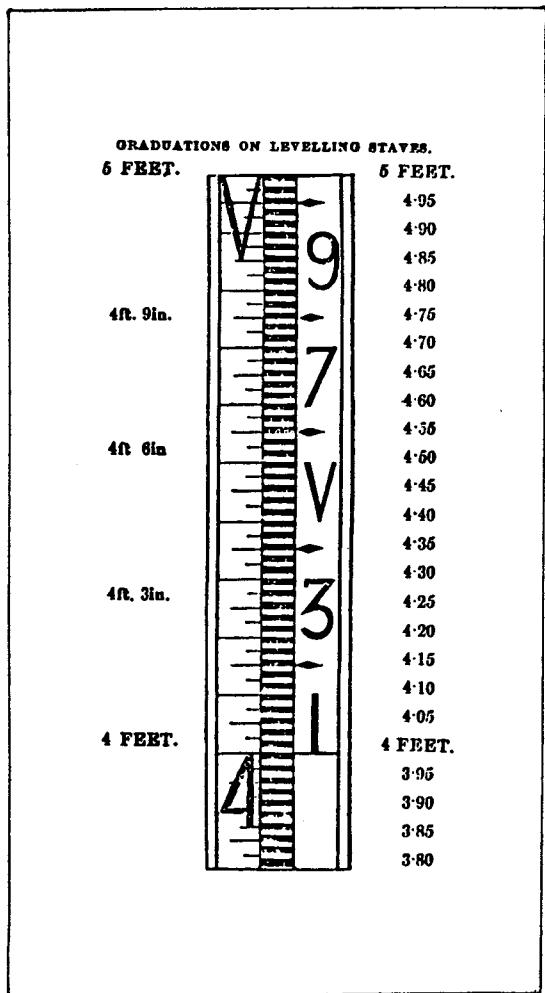


Fig. 6 Sopwith's improved levelling staff.
[T. Sopwith, *An Account of an Improved Levelling Stave* (1835?).]

come about without his involvement, nevertheless his interest in the matter did help to bring into being one of the more reliable water supply companies of the period.

Sopwith had an immensely high regard for the Institution of Civil Engineers and, the year before his death, stated that it was as a civil engineer that he wished to be remembered. In

retrospect, however, his achievements as a practising civil engineer do not allow him to be ranked as highly as others in the region but, considering his career as a whole, it must be concluded that it was unusual, especially in the North East. He had proved himself capable of managing successfully the mines at Allenheads, he had been extensively—if in a relatively minor way—involved in civil engineering works, he had carried out surveying works on a major scale, he had written widely so as to further the dissemination of knowledge, he had been successful in his training of engineers articled to him and he had achieved considerable academic distinction. Many members of the Institution had achieved less.

NOTES

¹ Newcastle All Saints; Register of Baptisms.

² "Memoirs", *Minutes of Proceedings, Institution of Civil Engineers*, 1878–79, 58, 345–58.

³ T. Sopwith, *Ms Diary of Thomas Sopwith, 1828–1879*.

⁴ A. Bramson, *Pure Luck; the authorised biography of Thomas Sopwith, 1888–1989*, Patrick Stephens Ltd, Wellingborough, 1990, 14.

⁵ "Memoirs", op. cit.

⁶ *Dictionary of National Biography*, Smith Elder, London, 1898.

⁷ *Folio to Minute Book 724, Institution of Civil Engineers*. (Elected 7 May 1833).

⁸ *Plan ... of the Durham Junction Railway, Thomas Sopwith, Newcastle, 1833*.

⁹ R. Grainger, *A proposal for concentrating the termini of the several Railways near Newcastle and providing depots with convenient access to the town*. Newcastle upon Tyne, 1836.

¹⁰ T. Sopwith, On the construction and use of Geological Models in connection with Civil Engineering. With a series of twelve Models. Original communication. *Minutes of Proceedings, Institution of Civil Engineers*, 1842–3, 2, 30–1.

¹¹ R. W. Rennison, *Water to Tyneside*. Newcastle upon Tyne, 1979, 30.

¹² T. Sopwith, *Ms. Diary*, op. cit., 10 Jan. 1845.

¹³ R. Sopwith, *Thomas Sopwith, Surveyor*. Pentland Press, Edinburgh, 1994, 225.

¹⁴ *Williams's Commercial Directory*, 1844.

¹⁵ B. W. Richardson, *Thomas Sopwith; with excerpts from his diary of fifty-five years*, London, 1891, 236.

¹⁶ *Certificate of a Candidate for Election, Royal Society*, 3 April 1845.

¹⁷ *Certificate of a Candidate for Election, Royal Society*, 7 May 1846.

¹⁸ B. W. Richardson, op. cit., 232, wrote that Armstrong's election caused Faraday, one of his sponsors, to comment 'What is the Royal Society for if it is not for such men as Armstrong'.

¹⁹ A. Raistrick and B. Jennings, *A History of Lead Mining in the Pennines*, Longmans, London, 1965, 321.

²⁰ B. W. Richardson, op. cit., 299.

²¹ A. Raistrick and B. Jennings, op. cit., 230.

²² "Obituary". *Minutes of Proceedings. Institution of Civil Engineers*, 1897–8, 134, 408–12.

²³ *Newcastle St. Nicholas; Register of Marriages*.

²⁴ T. Sopwith, *A Visit to Egypt by Paris, Lyons, Nice, Nimes, Marseilles and Toulon*, London, 1857.

²⁵ "Thomas Sopwith". *Monthly Chronicle of North Country Lore and Legend*, April 1889, 154–5.

²⁶ T. Sopwith, *Treatise on Isometrical Drawing*, J. Weald, London, 1834.

²⁷ T. Sopwith, *An Account of the Mining Districts of Alston Moor, Weardale and Teesdale*, Alnwick, 1833.

²⁸ T. Sopwith, *The National Importance of preserving Mining Records*, Newcastle, 1844.

²⁹ *Calendar, University of Durham*, 1857.

³⁰ "Obituary", op. cit.

³¹ T. Sopwith, *An Account of an Improved Leveling Stake*, Newcastle upon Tyne(?), nd.

