

OBITUARY

Sir Alan Muir Wood

Alan Marshall Muir Wood was born in Hampstead, London. His father was an Admiralty civil servant who ended his career as Director of Naval Stores. He spent part of his childhood in Malta, where he recalled children's parties on naval ships, which included overhead rides from the mast-head and similarly dangerous activities. When he was nine, the family moved to Chatham, where he enjoyed freedom to roam in the Naval Dockyard and he received his first (subconscious) exposure to engineering. He was educated at Abbotsholme School, Derbyshire, which had a progressive educational ethos. He enjoyed the emphasis on outdoor activities and learnt to recognise birds from their song. In January 1940 he enrolled at Peterhouse, Cambridge where he read Mechanical Sciences. He was elected to an Honorary Fellowship of Peterhouse in 1982, and was President of the Cambridge University Engineers Association 1982–1987. He commented that on graduation he knew little about engineering, but the mathematical training proved very useful for conceptualising and recognising where principles could be applied. On graduating in 1942 he was immediately called up and joined the navy, where training in a shipyard was followed by duties at sea as an engineer, and subsequently in refitting and repair work in Newcastle.

Having demobilised in 1946 he joined the Southern Region of British Railways and cut his geotechnical teeth working on the stabilisation of landslides at Folkestone Warren, which regularly interrupted the railway line. Reading about this project one discovers a number of threads subsequently woven into his future career. Graduating before soil mechanics was taught seriously as part of mechanical sciences, he had to develop a rapid understanding of site investigation, slope stability calculation, laboratory testing and interpretation of laboratory test results. He was delighted to be engaging in a forensic activity, using fossils to identify different strata of the Gault clay and deduce the detail of the slip mechanisms. He applied inventiveness to the design of simple techniques for monitoring continued movements both on the surface of the slip and at depth. He developed a miniature shear box in an attempt to find appropriate strength parameters and performed oedometer tests on disturbed samples to discover the compression and swelling characteristics in relation to the water content of the in situ material. The remedial works included the driving of a drainage tunnel, shield supported with advanced probing, through the slipped material – providing Alan's first encounter with tunnelling and emphasising the close relationship between tunnelling and uncertain ground conditions. And of course stability of the unstable slopes could only be maintained with appropriate management of the foreshore for which the neighbouring harbour pier at Folkestone prevented any depositional littoral drift.

Following a short spell with the Inland Waterways Executive he joined the consulting civil engineering firm Sir William Halcrow and Partners in 1952 and remained with the firm (now simply called Halcrow) until his death. He was a partner from 1964, senior partner from 1979–1984 and consultant from his 'retirement' in 1984 until his death. However, he saw retirement merely as an excuse not to have



Sir Alan Muir Wood FEng, FRS. 8 August 1921–1 February 2009

to tackle any project that did not interest him: his interest in engineering challenges remained undiminished until the end.

He specialised in geotechnical or ground engineering but within this broad field his particular interests were coastal engineering and tunnelling. His young children regularly accompanied him on visits to crumbling cliffs and protective groynes around the south coast of England and learnt that one town's shingle accumulation is another town's erosion: there is no such thing as a free beach. Several towns along the south coast of England owe their delayed departure into the sea to the protective interventions that Alan designed. Maritime activities included a research project in Christchurch Bay studying waves, weather and sediment transport; works at Dungeness nuclear power stations, Seaford, Lowestoft, Thessalonica and in the Dominican Republic and Honduras; and studies of effects of offshore dredging. His book *Coastal hydraulics*, first published in 1969, was for many years a standard undergraduate textbook and was significant in emphasising the need to combine scientific principles with engineering realities. In 'retirement' he was able to return to his love of the seashore as a member of the Review Board for the Ocean Outfalls in Sydney.

Following the Aberfan disaster in 1966, he was responsible for design and supervision works to stabilise spoil heaps in south Wales for the National Coal Board and produced inspection reports on spoil heaps in north Derbyshire and elsewhere. In 1975 he was appointed by the Treasury solicitor to provide expert technical evidence (Vidal against DoE) on reinforced earth: he always relished a good technical argument and enjoyed uncovering historical examples of soil reinforcement.

Internationally he is best remembered as a tunnel engineer. He was instrumental in setting up the International Tunnelling Association in 1973 following an OECD advisory conference on tunnelling held in Washington in 1970: he was founding president and then honorary life president and was assiduous in his attendance at and contribution to their annual congresses. He was always a popular and highly approachable figure who enjoyed challenging received wisdom at all levels, whether it was as a speaker at a plenary session or in discussion of some aspect of a paper or research project with a young engineer over coffee.

His first major tunnel project was the pair of tunnels on the east coast main line at Potters Bar, just north of London. His experience with segmental linings in these tunnels was to prove valuable in later tunnels that he designed in similar ground conditions in and around London.

The twin Clyde tunnels in Glasgow were constructed using compressed air to withstand the water pressures in the fluvial sands and gravels. The ground conditions were very variable and the detail of the cover provided above the tunnel was uncertain. One borehole – sunk to try to intercept a small trickle of air seen bubbling from the Clyde – struck a coarser layer of sand and released a geyser of air, sand and pebbles. Another ‘blow’ occurred where the old ferry berth on the north bank was supported on timber piles through sands and silts over the new tunnel. The piles were longer than the drawings indicated and had been loosened over the years by buffeting from the ferry. A tricky highway layout was required to accommodate the road approaches and the pedestrian/cycle subway with acceptable gradients within a very cramped site. Alan was amused to find that instrumentation installed in the lining by local academics was able to reveal when the compressed air was turned on and off but little else about the stresses exerted by the surrounding ground.

Tunnel design was to Alan another area of civil engineering that demanded appropriate application of scientific principles. A seminal paper, published in *Géotechnique* in 1975, entitled ‘The circular tunnel in elastic ground’, addressed the important topic of interaction between the tunnel lining and the surrounding ground. The paper showed how axial forces and bending moments induced in the lining depend on the degree of its flexibility relative to the ground, on the ratio of horizontal to vertical stresses in the ground, and on the presence of joints. The paper provoked important discussion and is widely cited; to this day many tunnel lining designers around the world use and refer to the ‘Muir Wood’ design method, based on this *Géotechnique* paper.

Although a practising engineer throughout his long career, Alan saw the importance of research and was a keen supporter of the extensive programme of research on tunnelling led by the then Transport and Road Research Laboratory (TRRL), at Cambridge University and elsewhere. He was co-author of an authoritative TRRL review of tunnel lining practice, and was also influential on a number of important Construction Industry Research and Information Association (CIRIA) research reports on tunnelling, contractual practice and risk.

The cargo tunnel at Heathrow Airport was a daring result of Alan’s analytical assurance and prior experience with

segmental linings at Potters Bar and elsewhere. The 10 m diameter tunnel was constructed with a shield just 7 m below an operational runway. Prophets of doom maintained that it could not be done – that there would be a risk of face collapse (in fact the volume loss was as little as 0.25%) and that the relatively thin, expanded segmental concrete lining (unbolted) would produce a high probability of unacceptable heave because of the high lateral stresses (settlements were in fact limited to 11 mm). The tunnel is still in daily use. To have made it deeper would have required steeper access gradients which Alan knew to be impossible because of space restrictions. The Heathrow Cargo tunnel is a case history to which reference is still widely made, not least as a notable example of a large diameter bored tunnel successfully constructed at very shallow depth with extremely small ground movements.

Also in the late 1960s, the 80 km Orange-Fish irrigation tunnel in South Africa used an observational method to choose the detail of the primary support – using sprayed concrete with or without rock bolts depending on the measured tunnel convergence. Such an approach to tunnel design and construction was not new – it had been used on the Snowy Mountains project in Australia – and Alan objected vehemently and regularly to the claims of originality of the so-called new Austrian tunnelling method – it was certainly not new, not Austrian and not really a ‘method’. He recognised that observation of the ground conditions and the ground response must play a central part not only in the design process but also in the way in which tunnelling projects are procured and managed. His second book, *Tunnelling: Management by Design* (2000), develops this theme. So many of the disputes or accidents for which he was expert witness or member of boards of enquiry seemed to him to be the consequences of elementary failures to observe. For example, if the purpose of observation had been understood then the collapse of the Heathrow Express tunnel could have been averted.

Alan’s association with the Channel Tunnel spanned some four decades. He prepared a feasibility report with site investigations for the Channel Tunnel Study Group from 1958–1960; he led further studies in 1964; he was the Halcrow Partner responsible for the joint consultancy team for the design and construction of the first stage of the Channel Tunnel Service Tunnel before its cancellation in 1975; he was specialist advisor to House of Commons Select Committees on the tunnel itself in 1981 and the Channel Tunnel Rail Link in 1985–86. But having done so much preparatory work on such a politically charged project it was both a relief and a disappointment that his final role was as a member of the five man Anglo-French Disputes Panel from 1988–98 where his fluency in French came into its own. Perhaps he regretted that the Channel Tunnel was not eventually built to his designs, but he regretted far more that the Disputes Panel had so much business to dispute. The project was completed over time and over budget with much acrimony between the various parties involved.

However, learning from this gruelling experience, he was delighted to have been invited to be a consultant on risk sharing and dispute resolution from the start of the project to build the Øresund crossing between Denmark and Sweden and subsequently to be Chairman of the Dispute Review Board for dredging and reclamation (1995–99). This was an altogether happier project in which he largely succeeded in his ambition to have what disputes that there were discussed and resolved among engineers who understood the real nature of the problems.

Alan always advocated strongly that the ground should be seen as a source of uncertainty: you can never tell exactly what you will find until you actually dig your tunnel. He

saw a tunnel as a hole in the ground with a geologist at one end and a lawyer at the other – or worse, increasingly and disappointingly, a hole in the ground with lawyers at both ends. He railed regularly at the short-sightedness of contract negotiators who sought to place all the risk with the contractor. He was certain that successful projects were conceived from the start as partnerships between client, designer and contractor, all having a shared goal. Since the ground was inevitably unknown then you must observe it and make necessary planned modifications to the design if conditions were actually worse or better than had been intended. Observations of the response of the ground, clear understanding of mechanisms of behaviour and appropriate contractual arrangements were vital and it was usually an absence of one of these factors that led to failure.

In 'retirement' he advised the House of Commons and others on the route and likely structural damage from the Jubilee underground line in London and more recently on the potential effects of Crossrail. As a member of the Review Board on Sydney Ocean Outfalls he brought together his experience in both coastal engineering and tunnelling. He was an expert witness for the inquiry into the methane explosion at the water treatment works at Abbeystead, Lancashire. He was an expert witness for Arbitration on the Strategic Sewage Disposal Scheme, Hong Kong (1997–2001). He had strong views about the importance of technical integrity of expert witnesses: those who encountered him in this role recall his penetrating evidence and clarity of thought.

His last forensic advice concerned the investigation into the collapse of the tunnel being constructed to accommodate a new Tesco store at Gerrards Cross over the railway line on which he had travelled to work daily in the 1950s and 1960s from his home in Buckinghamshire. In trying to deduce what had happened here and in other failures he demanded clear explanation of the underlying mechanics: elaborate numerical analysis was never a substitute for engineering understanding and often served only to obfuscate. On this and other projects he was disappointed that settlement out of court, while to be applauded on grounds of reducing legal fees, meant that the lessons would not be promulgated for wider education and avoidance of repetition.

He read and wrote widely on subjects directly and tangentially linked to civil engineering. His Presidential Address to the Institution of Civil Engineers (1978) cast a baleful eye on the damaging role of economists in decision making. His Unwin lecture addressed the subject of energy (1982). His 'Sir Alan specials' – contributions to the letters columns of *New Civil Engineer* or *The Times* – were always pithy, erudite and apposite (e.g. 2005, 2008).

His interest in the history of engineering combined with his tunnelling expertise led to his willing participation in the campaign to save Brunel's Thames tunnel from unnecessary lining with sprayed concrete (1994–97). Liking nothing better than to spend hours in the ICE Library, he recently dug out previously unfamiliar work by Thomas Young on the line of thrust in arch bridges and speculated that this must have influenced Brunel's designs. A paper was published in the *ICE Proceedings* just before he died (2009).

He was President of the Institution of Civil Engineers (1977–78); founding President and Honorary Life President of the International Tunnelling Association (1973–2009) who have instituted an annual Muir Wood Lecture starting in 2010. A Prestige Lecture series named in honour of Sir Alan Muir Wood was inaugurated in 2006 at the International Symposium on Aerodynamics and Ventilation of Vehicle Tunnels in Slovenia. He was a Fellow of the Royal Academy of Engineering and, rarely for an engineer, also a Fellow of the Royal Society. He was knighted in 1982 for

services to civil engineering. He is survived by his wife, three sons and eight grandchildren.

David Muir Wood and Robert Mair

LIST OF PUBLICATIONS

- Muir Wood, A. M. (1955). Folkestone Warren landslips – investigations 1948–50. *Proc. ICE* Pt II, 4 June, 410–428; Discussion 441–166 and Oct, 705–712.
- Muir Wood, A. M. (1969). Notes on Heathrow Airport Cargo Tunnel. *7th Int. Conf. Soil Mech. Found. Engng, Mexico City*, session 4.
- Muir Wood, A. M. (1969). *Coastal hydraulics*. MacMillan (2nd edition (1981) with C. Fleming).
- Muir Wood, A. M. (1970). Discussion: Folkestone Warren landslips. *Géotechnique* 20, No. 1, 110–113.
- Grange, A. & Muir Wood, A. M. (1970). The site investigations for a Channel Tunnel 1964/65. *Proc. ICE* 45 Jan, 103–124 (Discussion (1970) 47 Dec, 535–539).
- Muir Wood, A. M. & Casté, G. (1970). In-situ testing for the Channel Tunnel. *BGS Conference on in-situ testing of soils and rocks, London*, 109–116.
- Muir Wood, A. M. (1970). Characteristics of shingle beaches: the solution to some practical problems. *Proc. 12th Conf Coastal Engng, Washington* 2, 1059–1075.
- Muir Wood, A. M. (1970). Soft ground tunnelling. In *Technology and potential of tunnelling*, Johannesburg, Vol. 1, pp. 167–174; Vol. 2, pp. 72–75.
- Muir Wood, A. M. & Gibb, F.R. (1971). Design and construction of the Cargo Tunnel at Heathrow Airport, London. *Proc. ICE* 48, Jan, 11–34 (Discussion (1971) 50, Oct, 187–201).
- Muir Wood, A. M. (1971). Engineering aspects of coastal landslips. *Proc. ICE* 50, Nov, 257–276 (Discussion, (1972) 53 Part 2, Sept, 401–416).
- Muir Wood, A. M. (1972). Tunnels for roads and motorways. *Q. J. Engng Geol.* 5, Nos 1 and 2, 111–126.
- Muir Wood, A. M. (1973). Criteria and systems of road tunnel ventilation. *1st Int. Symp. Aerodynamics and Ventilation of Road Tunnels, Canterbury*.
- Muir Wood, A. M. & Sharman, F. A. (1973). Tunnelling as a social benefit. *Transportation and environment – policies, plans and practice*, Southampton, session 2, pp. 21–27.
- Muir Wood, A. M. (1973). The Channel Tunnel project. *Geograph. J.* 130, No. 2, 258–261.
- Muir Wood, A. M. & Tough, S. G. (1973). The Channel Tunnel. *Tunnels and Tunnelling*, 5, No. 3, 234–239.
- Muir Wood, A. M. (1975). The circular tunnel in elastic ground. *Géotechnique* 25, No. 1, 115–127, (Discussion (1976) 26, No. 1, 231–237 and 252).
- Muir Wood, A. M. (1975). Tunnelling hazards: UK experience. *Hazards in tunnelling and on falsework*, London, Vol. 3, pp. 47–59.
- Muir Wood, A. M. (1975). Tunnelling, *Civil engineer's reference book*, 3rd edn.
- Muir Wood, A. M. (1976). The role of Local Associations. *Conference on civil engineering education and training*, Swansea, paper 3B.
- Muir Wood, A. M. & Craig, R.N. (1978). *Review of tunnel lining practice in the United Kingdom*, TRRL Supplementary Report 335.
- Muir Wood, A. M. (1978). Presidential Address – Institution of Civil Engineers, Nov 1977. *Proc. ICE* 64, Part 1, 1–23.
- Muir Wood, A. M. (1979). Fourteenth Sir Julius Wernher Memorial Lecture: Ground behaviour and support for mining and tunnelling. *Proc. IMM* (April).
- Muir Wood, A. M. (1979). Foundation engineering for offshore structures. Opening address. *Proc. 2nd Int. Conf. Behaviour of Offshore Struts, BOSS'79, London* 1, 41–58.
- Muir Wood, A. M., Cooper, W. H. & Kidd, B. C. (1980). Dams and their tunnels. *Water Pwer* 32, No. 2, 27–33; 32, No. 3, 47–50; 32, No. 4, 37–44; 32, No. 5, 42–48.
- Muir Wood, A. M. (1981). Tunnel design: notes of scope and limitations. *Symposium on tunnelling and deep excavations in soils*. Associacao Brasileira de Mecanica des Solos, Sao Paulo, Brazil (April), pp. 1–18.

- Muir Wood, A. M. & Sauer, G. (1981). Efficacy and equity of the management of large underground projects. *Rapid excavation and tunnelling conference*, San Francisco, chapter 63, pp. 1032–1044.
- Muir Wood, A. M. (1981). *Underground space: its contribution to the sustainable society*. American Underground Space Association, Kansas City, June.
- Muir Wood, A. M. (1982). Unwin Lecture: Energy research – whence and whitherwards. *Proc. ICE* **72**, Part 1, 285–305.
- Muir Wood, A. M. (1983). Analysis and design of tunnels in soft ground. *Tunnelling symposium*, Singapore.
- Muir Wood, A. M. (1983). Energy and Infrastructure. *CEBI/CEDIC Seminar*, Brussels.
- Muir Wood, A. M. (1984). Suggested principles for design. *International symposium on low cost road tunnels*, Oslo.
- Muir Wood, A. M., Trenter, N.A. & Crook, D.E. (1984). Engineering aspects of nuclear waste disposal in argillaceous rocks. *International Society of Rock Mechanics symposium*, Cambridge.
- Muir Wood, A. M. (1984). *Tunnelling the Channel – why not?* British Association for the Advancement of Science, Norwich Meeting (Sept).
- Muir Wood, A. M. (1984). *Second Severn Crossing : barrage, bridge or tunnel?* South Wales Institute of Engineering, Cardiff.
- Muir Wood, A. M. (1985). The making of cities – what are we to do? II Fundamentals: underneath and behind the city. *Bosson Lecture. R. Soc. Arts* **133**, 836–848.
- Muir Wood, A. M. (1985). *Tunnelling: the shifting boundaries between art and science*. Royal Society of Edinburgh.
- Muir Wood, A. M. (1985). Economics of tunnelling, automation and future trends. *Conference on tunnelling and underground transport*, Boston, Massachusetts (April).
- Muir Wood, A. M. (1986). Industry/university interaction - conditions for change. *Conference on transfer of research results into industry*, (Sept 1985) Tech Change Centre, 78–84.
- Muir Wood, A. M. (1986). The contractual basis for underground works. *Lecture to Mass Rapid Transit Authority*. Singapore: MRTA.
- Muir Wood, A. M. (1986). Engineering – the professional and social dimensions. *Engineering Council Regional Lecture*, Manchester.
- Muir Wood, A. M. (1986). Tunnelling in soil and weak rock. *Civil engineering for underground rail transport* (ed. J. T. Edwards), pp. 305–324. Butterworth.
- Muir Wood, A. M. (1987). Economics of tunnelling, automation and future trends. *Conference on tunnelling and underground transport*, pp. 38–45. Elsevier.
- Muir Wood, A. M. (1987). Aspettative e prospettive alle soglie del XXI secolo per la realizzazione di gallerie e di opere sotterranee. Economia: problemi e possibilita (Expectations and prospects at the threshold of the 21st century for the construction of tunnels and underground works. Economics: problems and opportunities). *Gallerie e Grandi opere Sotterranee* **25**, 25–30.
- Muir Wood, A. M. (1987). The economics of tunnelling: problems and opportunities. *International conference on large underground openings*, Florence, 1986. *Tunnelling and Underground Space Technol.* **2**, No. 2, 131–135.
- Muir Wood, A. M. (1986). Management of risk in large projects. *Proc. 1st Int. Conf. Engng Mgmt Theory Applic*, Swansea, 79–83.
- Muir Wood, A. M. (1987). To NATM or not to NATM (Critical appraisal of New Austrian Tunnelling Method): Geocolloquium, Salzburg, Oct 1986. *Felsbau* **5**, No. 1, 26–30.
- Muir Wood, A. M. (1989). Tunnelling. *Civil engineer's reference book*, 4th edn. Amsterdam: Elsevier.
- Muir Wood, A. M. (1990). The observational method revisited. keynote lecture. *Proc. 10th South East Asian Geotech. Conf., Taipei* **2**, 37–42.
- Muir Wood, A. M. (1990). The Channel Tunnel – view of a teredo. (Lecture to Japan Tunnelling Association Symposium, Tokyo March 1990.) In *Development and utilisation of subsurface space in urban areas*, pp. 413–428. Tokyo: Japan Tunnelling Association.
- Muir Wood, A. M. (1990). Geoffrey Morse Binnie. *Biograph. Mem. Fellows of the R. Soc.* **36**, 45–57.
- Muir Wood, A. M. (1991). The Channel Tunnel – view of a teredo. (Lecture to Japan Tunnelling Association Symposium, Tokyo March 1990.) *Tunnelling and Underground Space Technology* **6**, No. 1, 77–82.
- Muir Wood, A. M. (1991). Tunnelling under the Channel. *Science and Public Affairs, R. Soc., Lond.* **6**, No. 1, 21–29.
- Muir Wood, A. M., Orr, W.E., Beaver, J.L., Ireland, R.J. & Beagley, D.P. (1991). Abbeystead outfall works: background to repairs and modifications - and lessons learned. *J. Inst. Water Environ. Mgmt* **5**, No. 1, 7–20.
- Muir Wood, A. M. & Duffy, F. (1991). The professional in the built environment and society. *Proceedings of Ove Arup Seminar*, Madingley, Cambridge, (Oct), pp. 1–12.
- Muir Wood, A. M. (1993). Development of tunnel support philosophy. In *Comprehensive rock engineering*. (ed. J. A. Hudson), Vol. 4, pp. 349–368: Pergamon Press.
- Muir Wood, A. M. (1994). Geology and geometry: period return to Folkestone Warren. *Proc. XIII Int. Conf. Soil Mech. Found. Engng, New Delhi* **5**, 23–30.
- Muir Wood, A. M. (1994). Isambard Kingdom Brunel: engineering knight errant. Book review. *Notes and Records of the R. Soc. Lond.*, **48**, No. 2, 323–325.
- Muir Wood, A. M. (1994). Control of uncertainty in geotechnical engineering. In *Emerging trends in design and practice* (ed. R. R. Saxena), pp. 155–176. New Delhi: Oxford and IBH Publishing.
- Muir Wood, A. M. (1994). The Thames Tunnel: where shield tunnelling began (condensed from Smeaton Lecture 1993). *Proc. ICE, Civil Engng* **102**, Aug, 130–139.
- Muir Wood, A. M. (1995). *The first road tunnel – a planner's guide*. La Defense: Permanent International Association of Road Congresses.
- Muir Wood, A. M. (1996). Ethics – the engineer. *Bus. Ethics*, **5**, No. 2, 7075.
- Muir Wood, A. M. (1996). Systems engineering and tunnelling: a new look (in Italian and English) *Gallerie e Grandi Opere Sotterranee* **50**, Nov., 16–24.
- Muir Wood, A. M. (1997). Alfred Maurice Binnie. *Biograph. Mem. Fellows R. Soc.* **43**, 73–86.
- Muir Wood, A. M. (2000). *Tunnelling: management by design*. London: Spon.
- Muir Wood, A. M. (2002). Tunnel vision. *Ingenia, R. Ac. Engng* **11**, 13–17.
- Bayliss, D. & Muir Wood, A. M. (2002). *Motoring towards 2050: making it happen*. Swindon: Halcrow.
- Muir Wood, A. M. (2003). What tends to go wrong in tunnelling? In *Rational tunnelling* (ed. D. Kolymbas), pp. 237–254. Berlin: Logos Verlag.
- Muir Wood, A. M. (2004). Ahead of the face. Fifth Harding memorial lecture, 15 April 2004, to British Tunnelling Society. Supplement to *Tunnels & Tunnelling*.
- Muir Wood, A. M. (2004). *Civil engineering in context*. London: Thomas Telford.
- Muir Wood, A. M. (2005). Expert witness: there is no place for the camp-follower. *The Times Law Section*, 6 Sept. 2005, 8.
- Muir Wood, A. M. (2006). Realistic aspirations for 21st century tunnels: risk, comfort, energy efficiency. *ISAVVT-12* Portoroz, Slovenia (13 July).
- Muir Wood, A. M. (2008). Good Samaritans: religious parables and the Prime Minister's incomplete interpretations. Letter to *The Times* 23 December.
- Muir Wood, A. M. (2009). Thomas Young and the Brunels: masters of masonry analysis. *Proc. ICE, Civil Engng* **162**, CE1, 42–48.