

Joshua Thomas Noble Anderson (1865-1949), Engineer A Biographical Sketch

by Professor Brian E. Lloyd, AM, MA, PhD, FIEE, FIEAust, CPEng(Reg)
School of Engineering & Technology, Deakin University
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Joshua Anderson practised innovative engineering during difficult times in the Depressions of the 1890s and 1930s. Born in 1865 in Ireland, he graduated in engineering and arts. Following short engineering engagements, he came to Victoria first in 1889. His first contact with engineering in Victoria was on the Laanecoorie Weir, and then took up a lectureship in mechanical engineering at the University of Melbourne, where he met John Monash. In 1894 they set up a consulting partnership designing and contracting engineering works. After a meeting with Frank Gummow of Sydney, in 1897 Anderson negotiated an agreement whereby Monash and Anderson became Victorian agents for reinforced concrete. They secured contracts for several bridges using the technology.

Anderson was appointed engineer to the Drainage Board in Dunedin, New Zealand from 1902 to 1906, before returning to Victoria to become Shire Engineer and engineering consultant for several local government councils in various parts of Victoria. In the 1920s was engineering consultant to Walter Burley Griffin, advising on the design of Canberra the water supply system and the Cotter Dam. Later he became Consulting Engineer to the City of Richmond. He joined the Victorian Institute of Engineers in 1890, and was President 1900-2 and in 1919. He joined the IEAust as a Corporate Member in 1926. He died in 1949.

Joshua Anderson, BA, BE, CE, MICE, MASCE, MVIE, AMIEAust was born 14 February 1865, at Springbank, Dunmurry, Co Antrim, Ireland, the third child and second son of the 7 children of the Reverend Samuel Anderson, Vicar of Upper Fals, Ireland. His mother was the daughter of Nelson Foley of Ballygally, sometime High Sheriff of Waterford. The family originally had supported Jacobite cause, but later became supporters of the Conservative Party.¹ When the Church of England in Ireland was disestablished in 1869 to become the Church of Ireland, Rev. Anderson, along with some other Church of England clergymen, refused to accept the change and as a result they were excluded from further preferment and continued in their parishes on the stipend of a curate. This family characteristic of standing firm on beliefs was present in his son's life, as was a touch of puritanism.

Despite the fact that the Rev. Anderson was not well paid, each of his children received a good education. The eldest daughter, Alice, was the first woman to study for and take out a degree at Belfast, gaining first place in mathematics and astronomy. Joshua was educated principally at the Royal Academical Institution and Queen's College in Belfast, and at the Royal University of Dublin, graduating in engineering and arts. His first professional engagements were with the Belfast Main Drainage Works, the Belfast Water Works and the Manchester Water Works. He then took up private practice for a time before leaving for Victoria in 1889. He returned to the Old Country in 1890 and received a few commissions for work on sewerage and water works in Holland, but came back to Melbourne in 1891.

His wife was Ellen Mary White-Spinner, also

the child of a Church of England clergyman with a large family, and born at Rathmines, Dublin in 1864. She was 28 at the time of her marriage, but that did not deter her father from attempting to lay down conditions. For example, during the courtship letters were to be limited to once a month. He also thought poorly of Joshua's prospects in the colonies, and advised him that he would need a position paying £400 a year if he was to provide adequately for his daughter. On the other hand, if they were to remain in Ireland and take a respectable position such as a county surveyor, £200 a year would be adequate. None of this advice deterred the young couple. The marriage was celebrated in Melbourne on 21 April 1892 at St Margaret's Church of England, Caulfield, by Dean Hussey Burgh Macartney.² Dr Leeper, Warden of Trinity College within the University of Melbourne, gave the bride away *in loco parentis*.

Anderson's first contact with engineering in Victoria was on the construction of the Laanecoorie Weir, under Stuart Murray, an important engineer in the early development of water systems in Victoria. Mr Murray had hopes of Anderson succeeding him in the Water Supply Department, but Anderson was firm in his rejection of working for the government.

Instead he took up a lectureship in mechanical engineering under Professor Charles Kernot at the University of Melbourne.³ He began

1 *Cyclopaedia of New Zealand*, c 1905, on Anderson's life to 1890, and on his period in New Zealand.

2 Dean Macartney (1800-1894) came to Australia in 1848 with Bishop Perry.

3 Biographical notes are from his daughter, Mrs Claire Fitzpatrick, and grand daughter Mrs Jenny S. Ellis (daughter of Professor & Mrs Macmahon Ball). Information on Monash and Anderson is from Serle, G. *John Monash: A Biography*, Melbourne University Press, Melbourne, 1982.

his association with that famous engineer and soldier, John Monash, late in 1891 when Monash was struggling to secure an engineering qualification by cramming for the municipal surveyor's [ie: engineer's] examinations. Monash then began to read for the examination for the Engineer for Water Supply examinations in January 1892, and passed with high marks under Anderson's guidance. Monash had entered the University at the age of 16 in 1882 to study Arts and Engineering, but he led an erratic student life and became ill in 1885. He left the University without graduating and began work as an engineering assistant. He finally graduated Bachelor of Civil Engineering (BCE) in 1892 after a scholastic career of many distractions. He gained the MCE in 1893, then BA and LLB in 1895.

Monash and Anderson were much the same age and they liked each other from the start of their association at the University, perhaps because of the complementary nature of their characters. Monash was an organiser and good in money and contractual matters. Anderson, a tall, strong man, was a very able and innovative engineer, but not good at managing money. He could be charming, lively and entertaining, but he could also be a somewhat difficult man who had but a passing acquaintanceship with the words 'tact' and 'compromise' when dealing with associates. However, he was popular with labourers working under him, and he made it a practice occasionally to shout them a drink after work. He was quite temperate himself, although not a total abstainer, and he was never heard to use strong language. In June 1894 Anderson and Monash set up a consulting engineering partnership called Monash and Anderson, offering their services as civil, mining and mechanical engineers from their office at 49 Elizabeth Street, Melbourne. The story goes that the order of their names in the firm came from a toss of a coin. Anderson continued lecturing at the University part time until 1896.

Their consulting practice included the arrangement of contracts and supplies for building the engineering works they designed. An venture was a contract for a mile-long aerial tramway for the Landy's Dream Gold Mining Co, seven miles out of Walhalla on the Woods Point road. The ropeway was to bring quartz down from the mine to the crushing battery. The project turned out to be a struggle against late deliveries of the wire rope from England, difficulties with transport, and illness. Anderson spent months on the site getting the equipment into operation. Because of delays there were problems with the final payment and they had to go to court. However, there were other benefits: they held shares in the company and bought and sold

Further information comes from the Author's researches on the Jamieson district for *Gold at the Ten Mile*, Shoestring Press, Wangaratta, 1978, and *Engineers in Australia: A Profession in Transition*, Macmillan, Melbourne, 1991.

as prices fluctuated.⁴ Soon afterwards another assignment required them to move a 28 ton boiler from Daylesford to Walhalla and to erect a large battery for the Golden Fleece Co. This time Monash was at the site.

Anderson must be given the credit for introduction of the technology of reinforced concrete into Victoria. In September 1897 he had a meeting with Frank Moorhouse Gummow whose firm, Carter Gummow and Co, held Australian patent rights for the Monier reinforced concrete process. Gummow, a graduate in engineering from the University of Melbourne, was introduced to Anderson by Professor Kernot. Anderson negotiated a temporary agreement whereby Monash and Anderson became the Victorian agents for Gummow. From this fact, Serle (1982, p. 131) makes the observation that 'It was Anderson . . . who made the contact that ultimately made Monash's business and professional career.'

On the basis of this new concrete technology, Monash and Anderson secured contracts for bridges in Melbourne, Geelong and Bendigo. While Monash was on an assignment in Perth, Anderson supervised the construction of several early reinforced concrete bridges, including the Anderson Street (Morrell) Bridge across the Yarra River in Melbourne, and the Fyansford Bridge near Geelong for the Shires of Corio and Bannockburn.⁵

The Morrell Bridge was tested successfully in 1899 and came in for considerable praise.⁶ There remains some confusion concerning actual roles in this early reinforced concrete structure. According to Lewis (1988), writing on the history of concrete technology, the design was carried out by W. S. Baltzer, who had been an engineer with the NSW Public Works Department before he joined Carter Gummow and Co.⁷ Anderson family tradition has it that it was Joshua who persuaded Mr Catani of the Victorian Public Works Department to use the new structural medium for the bridge. It seems likely that, as in the controversy over the design of the Sydney Harbour Bridge, credit for the design belongs to both Anderson and Baltzer. A logical division of roles would have been Anderson in Melbourne designing the form and alignment of the structure and the establishment of the structural parameters, while Baltzer in Sydney designed the reinforcement and

4 Serle, *op. cit.*, pp 122-3.

5 The bridge was renamed Morrell Bridge by the Melbourne City Council in 1934, after three-times Lord Mayor, Sir Stephen Morrell. *Argus*, 10 May 1935.

6 An article in *The Building Engineering and Mining Journal*, 29 July 1899, stated that they had 'been at great pains to get the system so far advanced as it is now. They certainly deserve credit for the very favourable results arrived at'.

7 Lewis, M. *200 Years of Concrete in Australia*, Concrete Institute of Australia, Melbourne, 1988.

concrete details.

There were some technical problems with other bridges as the partners came to grips with the engineering intricacies of reinforced concrete, and there were financial difficulties with several contracts. A major difficulty arose with the Shires of Corio and Bannockburn, for whom the design and construction of the Fyansford Bridge were very successful. The behaviour of the two councils was reprehensible as they sought by court action to delay and then to avoid final payments, causing Monash and Anderson financial difficulties. The case was settled in April 1903 at considerable loss to them.

The partnership of Monash and Anderson ended at about the same time, although it effectively came to an end in 1902 when Anderson took a position in Dunedin, New Zealand. Financial difficulties were such that one or other partner had to leave, and the decision that Anderson would go to Dunedin was made on another toss of a coin.⁸ Monash remained to build up the concrete pipe business, and in so doing he was able to consolidate his affairs. In the settlement of the partnership, Anderson was discharged of the outstanding debts of the consulting firm, but he had to renounce any right to profits from the Monier process.⁹ With the famous building contractor David Mitchell (Dame Nellie Melba's father), the Reinforced Concrete and Monier Pipe Construction Co Pty Ltd was formed in 1905, taking over the Victorian rights to the Monier concrete technology without Anderson's participation.

Joshua Anderson took up the Dunedin appointment in May 1902 as consulting engineer to the newly constituted Drainage Board, where his principal responsibility was the installation of a sewerage scheme, but he retained the right of private practice. At the time of his departure from Victoria he was President of the Victorian Institute of Engineers, and had been since 1900. He had joined the VIE in 1890, and was President again in 1919, the year in which the Institution of Engineers, Australia, was formed out of the State-based engineering societies, but from which the VIE stood aside. Do we see here the influence of Anderson, and his characteristic of determined independence?

His sense of innovation, together with inability to compromise on matters of principle, caused tensions with the Drainage Board, but he remained for four years to see some major decisions and innovative engineering works put in place, including the installation of three large diesel-driven pumps imported from Holland.¹⁰ The stay in Dunedin was marred by the accidental death of Jack Anderson, Joshua's brother, on work associated with the

Drainage Board. Anderson resigned in February 1906 and took his growing family back to the old country, with the thought that the colonies were no place for the education of children. However, after years absence from Europe he found that his 'colonial' experience counted for little, and work almost impossible to obtain. Further, Mr and Mrs Anderson came to realise that Australia might be a better place to bring up a family after all, so the decision was made to return to Victoria.

The family, now six children including a new baby, travelled steerage and arrived in Sydney on 1 November 1907 with only £100 left. During his earlier time in Melbourne, Anderson had selected 450 acres at Narbethong, and this is where they settled: in a three-room house built as the nucleus of a later larger house, about a mile from the main road and two miles from Narbethong. During their five-years away, Miss Annie O'Neil at the Narbethong Post Office had let the place to timber getters, and when the Andersons arrived back they found the beds infested with fleas and bed bugs. The whole place had to be disinfected, and Mrs Anderson and the younger children stayed at the nearby St Fillans while this was going on. The house, constructed of local timber and with a detached earthen floored kitchen, was enlarged to become the family home called *Springbank*.

Anderson had to find work quickly. Victoria was still recovering from the great depression of the 1890s, and the government departments were keeping their engineering work to themselves; there was little work available for consulting engineers. The most promising field was municipal engineering, and before long Mr Anderson became Shire Engineer for several local government councils in various parts of Victoria. He often had to be away for long periods, and the family had to adapt quickly to their new surroundings. To make matters worse, on the voyage out Mrs Anderson had torn an Achilles tendon, and she was unable to get about. Life was very difficult for her, with a young baby in these fairly primitive conditions for the first several years, especially as she had had no experience of living in the bush. However, she was a resourceful woman and in her previous time in Victoria she had developed a love for long walks in the hills. Her first daughter Frances, aged just 13, had to learn to cook and make clothes, and Stewart, the only son at the age of 14, cut the firewood and taught his sisters bush craft. The children learned to shoot rabbits and catch fish, look after poultry, milk cows and fix fences. All became adept horse riders.

When supplies came from Healesville on the mail coach once a week, the children had to carry them from the road to the house. In 1909 the winter floods washed away the Anderson's bridge across Fishers Creek on the track in from the road, and they were isolated and snowbound. The hunting skills of the children were of great value at that time.

Anderson was Engineer to the Shire of Alexandra from 1910-12, Healesville 1911-18 and

8 As recounted by Mrs Claire Fitzpatrick.

9 Serle (1982), pp. 131-140, 155-6.

10 McDonald, K. C., *City of Dunedin: A Century of Civic Enterprise*, the Dunedin City Corporation, 1965.

Howqua at Jamieson from 1911-19. He is also said to have undertaken consulting work for the shires at Rosedale, Corryong, Tallangatta, Doncaster and Templestowe, and for the water supplies at Kilmore and Wangaratta. A good deal of travel was involved in servicing these appointments from his home at Narbethong.¹¹ Often he was able to get home for only one weekend in a month. Each appointment would have been poorly-paid, and the work was hardly challenging to an engineer of Anderson's accomplishments. But as he probably said, needs must when the devil drives.

At first his mode of transport was by horse and jinker, then by a Brough motor bike. However, when travelling to distant parts he would walk the 16 miles to and from home to the Healesville Railway Station, and travel by train from Healesville first to Melbourne, and then on to his destination. He developed an interest in motor vehicle transport, as the promoter of the Blacks Spur Motor Service Ltd, a co-operative venture that started in 1915 to provide a passenger service between Healesville and Alexandra, displacing the horse-drawn coaches. The company had shareholders and a garage and terminus in both towns. They purchased a couple of motor coaches (charabancs), secured the mail contract and for a time the business flourished. However, the two towns were quite different in their social make-up. The solid Alexandra community was concerned with the land and its associated businesses, and there was no tension arising between the religious groups. Healesville was concerned with tourism and timber, the latter on the wane at that time, and Anderson's affiliations with the Orange and Masonic Lodges occasionally caused enmity. These factors, coupled with Anderson's uncompromising ways, led to the failure of the co-operative, and contractors took over the passenger and mail service.

There were six Anderson children, the first four born in Melbourne:

- (i) Stewart, born 14 May 1893, was the only son, and he died in 1913 in Sydney in a drowning accident just after completing his training and being commissioned as a 2nd-Lieutenant in the Royal Australian Garrison Artillery.
- (ii) Frances, born 15 November 1894, and died aged 92, married Dr A. P. Derham, a paediatrician, and had four sons. She was a talented artist, trained at the National Gallery and at Swinburne Technical College, and specialised in child art. Her collection is in the National Gallery. She taught at Kindergarten Training College. Her book *Art for Children Under Seven* became a standard work and is still used as a text book for kindergarten and primary school teacher training after seven or more editions. She was honoured with an MBE for her work in child art.
- (iii) Alice, born 8 June 1897, attended the MCEGGS for five terms, but had to return home when the family

was unable to pay the fees. She died in September 1926 at the age of 29 as a result of a shooting accident.

- (iv) Katrine, born 1 November 1899, died 29 October 1991, completed the leaving Certificate at MCEGGS, but there was no money for University. She worked as a coding clerk for a number of firms, and wrote articles for magazines in her spare time. She married Professor W. Macmahon Ball when he was a young lecturer at the University of Melbourne.
- (v) Claire, born 11 September 1904 in Dunedin, married Dr A. S. Fitzpatrick, and had two children. She won scholarships to MCEGGS and the University of Melbourne. She was the first engineering student resident at Janet Clark Hall, but did not complete the engineering course. She became a journalist, worked as an assistant surveyor and draftsman and as a teacher, and later became a top breeder of dairy goats.
- (vi) Joan, born 18 April 1907 in Belfast, died 22 March 1994. She married Alan Jones, a grazier, and had two step children. She studied horticulture at Burnley College and Reading University, and worked with Edna Walling and also at Coombe Cottage, Dame Nellie Melba's home at Coldstream, as head gardener. For 20 years she owned *The Hermitage* on the Blacks Spur at Narbethong.

The four younger girls had at least part of their secondary education at MCEGGS, mostly as boarders. Not all of them settled well to the routine of boarding school after their country independence, and having been taught by both parents to think well and independently.

Alice achieved much in her short life. After MCEGGS, where she completed the Junior Public Examination, she set about teaching her younger sisters, who attended the Narbethong State School which was half time with Marysville. A good teacher, Alice was determined that Claire would get to boarding school on a scholarship.

Joshua Anderson's interest in cars was taken up by Alice. She had studied bookkeeping at school, and became secretary to the Blacks Spur Motor Service Ltd. The driver-mechanics taught her about cars, how to use the machinery in the garage and to drive. Her father gave her the deposit on a Hupmobile car for her 18th birthday present, and it came about in a manner that typified his rather haphazard business methods. He had decided that the Motor Service needed a modern passenger car for special purposes, such as for the transport of important passengers. He saw the big American car in Melbourne and decided to pay a deposit on it.

However, at the next meeting the directors declined to stand behind the purchase. Anderson was left with the car so he gave it to Alice. By 1918 she had a car hire service with women drivers. The business prospered, despite its initial capital as only the deposit on the Hupmobile. She built a motor garage and workshop in Cotham Road, Kew, staffed by women motor mechanics. The family was devastated by her tragic accidental death, but the garage continued for many years under her name, owned and

11 Information on local government appointments from *Municipal Directory, Victoria*, for the years 1910 to 1950, and other information from Mrs Claire Fitzpatrick.

staffed by women mechanics trained by Alice.¹²

Anderson tried two ventures at Narbethong. The first in 1909 was a eucalyptus distillery, to extract oil from the leaves of the plentiful blue gums in the bush. He purchased two square steel tanks and set up the distillery, which required around the clock operation. It was intended to be a family business, and young Stewart was deputised to keep the fire going throughout the night, but the poor lad was unable to wake up at the times required to stoke the fire. The venture produced a few gallons of eucalyptus oil, but it was not a success: the tanks later were used as water tanks for the house.

The second venture in 1913 was timber milling. There was a good stand of native beech trees about a mile back in the forest. Anderson secured a timber lease and set up a saw mill. The saws were driven by a Pelton wheel turbine operated by water brought down from a mountain stream through a 14 inch diameter wood-stave pipeline. They acquired a team of eleven bullocks to haul the logs, and were about to get started when World War I broke out. The resulting labour shortage, coupled with Anderson's over-estimate of the quantity of water available and consequent lack of power from the turbine, led to failure of this venture.

Anderson retained his appointment with the Shire of Howqua until the merger with Mansfield in 1919. After that the family moved to the city. An intermediate move was to use Frances' small flat in Kew, and later addresses were St John's Avenue and Churchill Street in Mont Albert. In the 1920s Anderson advised Walter Burley Griffin, advising on aspects of the design of Canberra including what later became Lake Burley Griffin, the water supply system and the Cotter Dam. The two families became friendly on a social level.

Anderson's next local government appointment was with the Shire of Traralgon until 1922, when Charles W. Candy succeeded him as Consulting Engineer to the Shire. He then gained the more prestigious appointment to the City of Richmond, succeeding Charles W. Rose. It is notable that Anderson did not become City Engineer, but was described as Consulting Engineer to the City. He retained his independence to undertake other consulting assignments.

Anderson joined the Institution of Engineers, Australia as a Corporate Member (the then grade of Associate Member) in 1926. In the Membership List published in 1937, his address was shown as 'Coane and Anderson, 379 Collins Street, Melbourne.' He had taken over the firm of J. M. and H. E. Coane and W. Reid Bell of 60-70 Queen Street.

He retained the Richmond appointment until he was about 79, and was succeeded by Claude Vaughan, BCE, AMIEAust in 1944 as City Engineer. A notable contribution while Anderson was at Richmond was the laying of concrete road pavements, the high cost being justified by the predicted 50-year maintenance-free life. His advocacy of concrete was justified.

Anderson was an innovative engineer with high competence and skills to match. He was a man of high principles, one of which was never to seek credit for his personal achievements, although he did accept credit when it was accorded him. He practised engineering during difficult times, beginning in the great depression of the 1890s and its aftermath in the years before World War I. His final years while at Richmond appear to have been more tranquil than earlier times, but then too he had to contend with another great depression.

Joshua Anderson died on 18 October 1949 aged 84 years, his wife having predeceased him in 1945.

12 Lake, M., and Kelly, F. (Eds) *Double Time - Women in Victoria - 150 Years*, Chapter by Mimi Colligan on Alice Anderson, Penguin, Melbourne, 1985.

