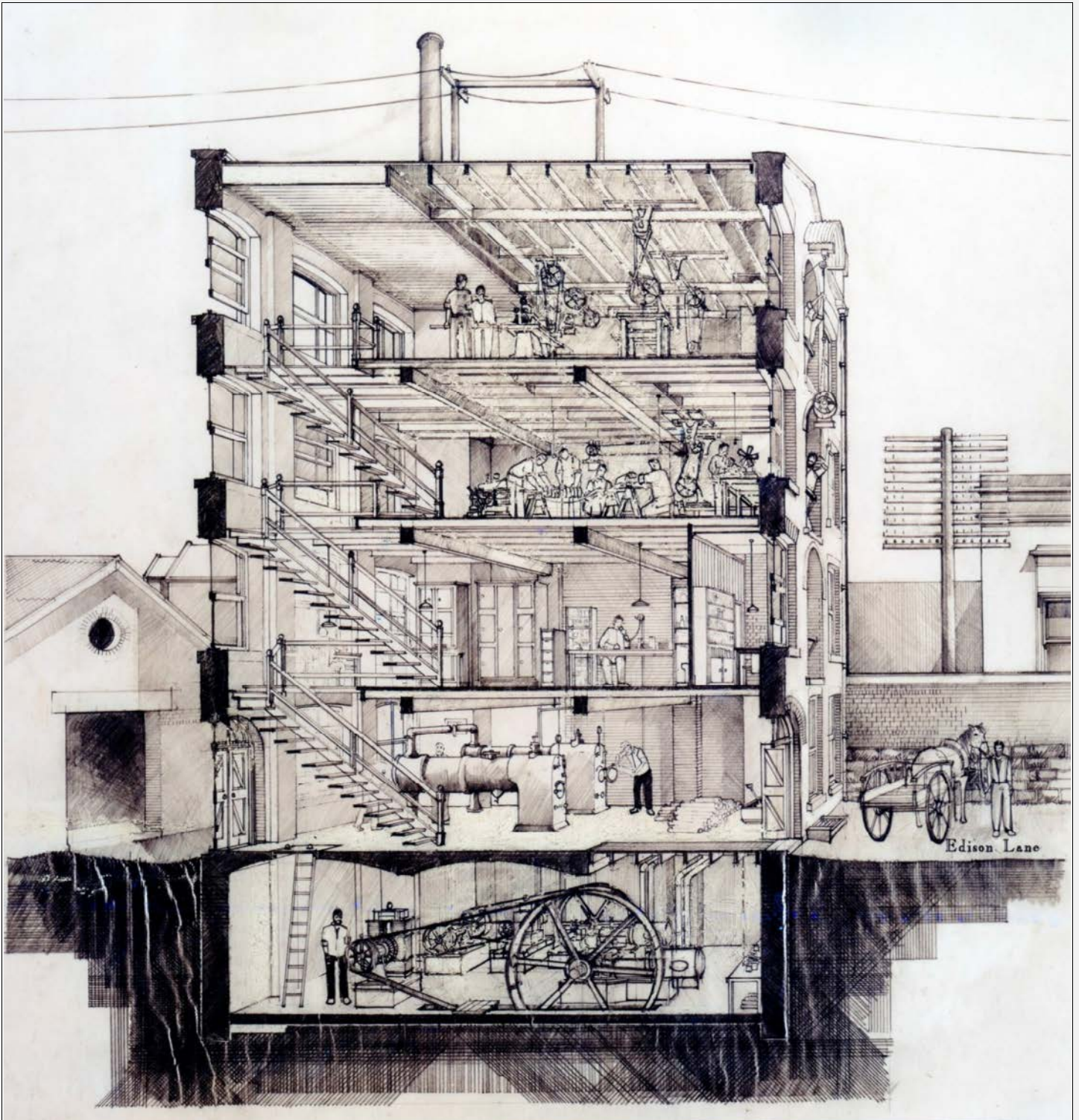


# EHA



## ENGINEERING HERITAGE AUSTRALIA



# Engineering Heritage Australia Magazine

**December 2013**  
**Volume 1 Number 1**

**EDITOR:**

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Cover Image: The former Barton White & Co.  
c.1888 Power Station and Factory in Qld.  
See a description of the drawing on Page 7.

This will be a quarterly magazine covering news items and stories about engineering and industrial heritage in Australia and elsewhere. It will be published online as a downloadable PDF document for readers to view on screen or print their own copies. EA members and non-members on the EHA emailing lists will receive emails notifying them of new editions with a link to the relevant EA website page.

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# *Mr Owen Peake, HonFIEAust., CPEng.*

## *The 2013 Winner of the Engineers Australia Sir John Monash Medal*

### **The Citation**

The Engineers Australia Sir John Monash Medal for Heritage recognises an individual who has made, over a considerable period of time, an outstanding contribution to engineering heritage in Australia.

Owen Peake has made an outstanding contribution to engineering heritage over very many years. He shows great leadership in the field through a broad range of activities, producing prodigious quantities of output while always maintaining high standards. He is a passionate advocate for engineering heritage as a member of Engineering Heritage Australia (EHA) since 2002, actively participating in both the Northern and Victorian chapters, and serving as the Chair of EHA for over three years.

Owen has authored over 30 articles and papers related to engineering heritage during the last ten years, which have been published in the Engineers Australia Magazine, various newsletters and presented at National and Australasian Engineering conferences. He continues to actively encourage others to write articles or papers on engineering heritage. He also led a collaboration with Victoria University's engineering school to provide mentored work experience to senior students in researching and writing nominations for selected engineering heritage works under the EHA heritage recognition program.

Owen is an active advocate of engineering heritage to the general community. He participated in the preparation of a public brochure 'Discover Engineering Heritage in Central Melbourne'. He takes the lead, and sometimes the sole role, in the researching and preparation of written nominations of notable heritage works under the EHA Engineering Heritage Recognition program in Victoria and other states. He frequently seeks participation of the wider community in formal recognition of these works, particularly by arranging public ceremonies to unveil EHA markers and interpretation panels around Victoria and interstate. He also drafts associated press releases and participates in interviews with local media.

Owen leads by example in conserving engineering heritage. Jointly with two colleagues he liaised with 'Major Projects Victoria' to secure the long-term preservation and public interpretation of the steam pumping station at the former Duke & Orr's dry dock.

He works to raise awareness within and beyond the engineering profession of the importance of conserving notable engineering heritage works, by means of published articles, formal presentations, and representations to public sector and private owners of significant sites.

Owen's activities and interests reach beyond Australia, serving to connect his Australian colleagues with international partners. He is a Member of the UK based Newcomen Society and is the Australian representative on the International Stationary Steam Engine Society. He is the Australian editor of that organisation's news bulletin, and a regular contributor.

Owen Peake continues to make an outstanding contribution to engineering heritage, serves as an excellent role-model for others working in the field, and is a prominent advocate for engineering heritage in the community.



Owen Peake receives his medal & the citation from Marlene Kanga, President of Engineers Australia, on 21<sup>st</sup> November 2013.

# *Dr John William Connell, A.M., D.Eng. E.A., & our most distinguished engineer, celebrate his 100<sup>th</sup> Birthday.*

The Victoria Division of Engineers Australia helped the distinguished engineer John William Connell celebrate his 100<sup>th</sup> birthday on the 23<sup>rd</sup> October 2013 with drinks and nibbles, champagne for toasts and a huge birthday cake, from midday to 2pm, at Division headquarters in North Melbourne. It was a great party, with several of Dr Connell's former colleagues from the salad days of John Connell and Associates (including Stan Johnstone, John Peyton and Jack Wynhoven)<sup>1</sup> and some close friends present, and a number of his long-term admirers, including me.



John Connell - Speech in reply

Photo - John Woodside

John William Connell was 26 before he began his engineering career in 1939 as a junior draftsman with the firm of Cyril Hudspeth and Associates in Melbourne. In August 1942 he joined the Australian Army – not the engineers, nor the artillery as one would imagine, but the 57<sup>th</sup>/60<sup>th</sup> Infantry Battalion. This unit of the Militia was commonly known as the Merri/Heidelberg Regiment, having been formed from two adjoining Melbourne Militia units in 1930. Connell was posted to the 57<sup>th</sup>/60<sup>th</sup> while they were encamped at Casino, in northern NSW, and

presumably training for the rugged jungle warfare to come. Early in 1943 the Battalion was sent to the Goon Valley, behind Port Moresby in New Guinea. In his forward to the 2011 issue of the Battalion magazine, Major John Connell refers to at least one occasion when he found an engineering job that could be done by him without calling in the Sappers. *“the big hole (he) dug”* was very clear in his memory.

*Our C.O. was very concerned with our lack of water in Goon Valley. He detailed me to join him in his anxious hunt for water. I learned that he believed in “divining”, but I was at least sceptical. However, after a long search he gained a strong reaction in our area, and after several tests, he instructed me to have a hole dug, to find the water, then for me to supervise the erection of a shower system. To shorten the story, he proved successful, so the unit could have daily showers.*

We were delighted to find Dr Connell in excellent form, very spry, networking around the room, with pertinent words to all his interlocutors, and only occasionally taking a short rest on his walker chair. All who wanted to were able to have a chat with him, and a lot of reminiscences were shared. The formal proceedings included a short address by John McIntosh, the President of EA Victoria Division. Dr Connell's former colleague John Peyton added a more informal and personal flavour to the proceedings in his address, from which it was evident that he both admired and appreciated John Connell as a boss and a friend and thoroughly enjoyed his work with John Connell and Associates and its succeeding consulting firms.



Richard Eckhaus presents an EA Award to John Connell

Photo - John Woodside

<sup>1</sup> Forgive me for having left out many of Dr Connell's former colleagues who were also present. – Ed.

After service in areas around Moresby, the 57<sup>th</sup>/60<sup>th</sup>, in the 15<sup>th</sup> Brigade, joined the 7<sup>th</sup> Division in the Ramu Valley and Shaggy Ridge areas in early 1944 for some pretty torrid battles and significant victories including the capture of Madang by a patrol from the Battalion on the 24<sup>th</sup> of April. The 57<sup>th</sup>/60<sup>th</sup> returned to Australia in August 1944, to regroup in North Queensland in October. But Major Connell was no longer with them. He was discharged from the army in October. May I presume because he was requisitioned to go back to work with Cyril Hudspeth, who seems to have had a number of Defence contracts going at the time?

John Connell resumed his structural engineering studies at the Working Men's College (RMIT), and I suspect soon graduated. He was still working with Hudspeth in 1956, and was thinking of setting up his own practice when Cyril Hudspeth died suddenly. Connell *went out on a limb financially, to acquire the practice from the Hudspeth estate*<sup>2</sup> and in 1958 changed the name of the practice to John Connell and Associates.

John Connell and Associates grew and developed as John Connell planned. Under his leadership it became one of the most successful consulting engineering firms in Australia, with widely diverging fields of practice. He brought in engineering experts from around the world to join the firm and help it grow. He set up one of the first computer aided design divisions (Consuldata) in such an engineering practice, back in the days when most of us engineering students were still working with primitive software and punched cards!

It would be quite impossible here to list all the



John Connell and the Editor in conversation

Photo courtesy EA Vic Division

important and innovative design contracts undertaken by the Connell practice. Stan Johnstone mentions two for which John Connell put together international teams in the 1960s. One was a new water purification plant for the MMBW. The other was the design and supervision of the Melbourne

Underground Rail Loop. A much earlier job, a fascinating one that started soon after Connell took over the practice, and went on for some years, was the complete reconstruction of The Age building at 233 Collins Street, turning the ornate, five storey Victorian building into a 10-storey glass and concrete skyscraper, all happening around the reporters and printers and editors who continued getting out their newspapers every day despite the chaos they were working in. The main thing that concerned the builders was that they had to completely reconstruct the whole building, without causing the giant presses to stop for a single day. My boss on my first construction job with Hansen & Yuncken had been the General Foreman, and he was still dining out on his stories of it. He told me how John Connell used to turn up every morning, almost without fail, for a thorough inspection of the previous days work, or to supervise anything important that was happening that day. A man dedicated to his work.

That may seem a trivial observation, but I understand it was typical of the man. His colleagues, admirers and friends describe Connell as a creative lateral thinker; one who leads from the front and sets examples for others to follow; a great team builder; quick to recognise people's skills – and use them for mutual advantage; a compassionate and interested employer; generous in spirit; a valued mentor to young people; an entertaining raconteur; and more.

That the engineering community, and the wider community, value John Connell's contribution is evident in the honours and awards he has achieved :- in 1980 he was awarded the prestigious Kernot Medal by the University of Melbourne; the most important award given to eminent structural engineers by Engineers Australia is the John Connell Gold Medal; the theatre in the head office of EA Victoria Division has been named the John Connell Auditorium; in 1991 RMIT awarded him an Honorary Doctorate of Engineering; and in 1987 he was awarded Member of the Order of Australia, in recognition of his service to civil engineering and to the community.

If Engineering Heritage Australia had a Hall of Fame, Dr John Connell, A.M., D.Eng., would have to be included, along with a list of his jobs. I think it is about time someone out there commenced a catalogue raisonné of his engineering works. There must be a few of his former colleagues who would be equipped to take on or assist with such a task.

If you want to find out more about John Connell, and see some photos

of the birthday party, Stan Johnstone has started a website dedicated to John Connell by past staff members who had the pleasure of working with him in his engineering offices spread throughout Australia between 1956 and 1990. To have a look, go to:

<http://www.johnstone.org.au/JohnConnell/index.html>

# Edward Barton & the Barton White & Co. Power Station

## 125 years since the first commercial electricity supply happened in Queensland.

The 20<sup>th</sup> August 2013 marked exactly 125 years since the first commercial supply of electricity was made available to the public in Queensland. The newly formed company of *Barton White & Co*, following demonstrations of the new invention of electric light, supplied the general Post Office in Queen St Brisbane with electric lighting.

The *Queenslander* reported on the 25<sup>th</sup> August 1888: *The general Post Office building in Queen St was lighted up on Monday evening (20<sup>th</sup> August 1888) for the first time by electricity, the contractors Messrs Barton White & Co., whose offices are situated in Elizabeth St at the rear of the Government premises (actually in Telegraph Lane), having completed their arrangements for starting work. The lighting was confined to the ground floor, where the despatching and receiving rooms, the letter carriers department, the delivery windows, and the private boxes are situated.*

*In this large hall thirty two of the fifty volt Swan lamps have been placed, each being of about 16 candle power (60 watts), and the light given was fairly satisfactory as a whole, though in some places the great height at which the lamps were hung was somewhat of a drawback. The machinery is situated in a large shed on the contractor's premises. The shed measures 40ft by 15 ft. A 100 light Victoria-Brush dynamo and a 12 horse power Brown and May engine were in use, and the firm intend at no distant date to offer the electric light as well as motive power to other buildings in the vicinity.*

Brisbane in 1888 was only 7 years behind the world's first commercial public electricity supply system in Godalming in England in 1881. The advent of "cool" electric light to replace the "hot" gas lights was a welcome change for the citizens in a sub-tropical city, and as had been reported previously in the *Brisbane Courier* on 23 June, *during summer nights, the employees of the Post Office have suffered considerably through the vitiated state of the atmosphere in this room caused by the large consumption of gas and bad ventilation.*

The Barton & White enterprise started off providing the whole gamut of electrical services, as well as generation and supply wiring, by "manufacturing all fittings for electric light and power, supply brackets for lamps, sockets, cut outs, portable hand lamps, reflectors, arc lamps of 2000 candlepower, electric motors, etc. and undertake electrical work in all parts of the colony". (S.A. Prentice *Edward Barton Pioneer Electrical Engineer*, 1988)

From this humble beginning, using small carbon filament lamps and steam boilers fuelled by wood (because the cheaper coal was found to be a smoke nuisance), the whole electricity supply industry in Queensland has grown to provide a service right throughout our state, and which is essential to our modern way of life.

Brian Becconsall,  
*Engineering Heritage Queensland*  
10 Aug 2013



Left: The 4-storey brick building was the Barton White & Co. Power Station in Brisbane from 1889 to about 1900. The building looks as though it is still in the process of being converted into the power station/factory it became. The shed in the foreground is probably the 15ft x 40ft shed which held the first, 1888 power station. The Church in the left background is St Stephens Cathedral in Elizabeth St, Brisbane.

Note 2 men standing on the roof, men standing in the loading bays for the cathead hoist, a horse & cart and several men in the foreground, and the man standing on the rows of cross-bars on the telegraph pole in the lane to the right of the brick building.

Acknowledgements: Most of the information in this story comes from the writings of S. A. Prentice, former Emeritus Professor at the University of Queensland. These include an entry in the ADB Vol.13 on E.G.C. Barton and S. A. Prentice's book *Edward Barton, Pioneer Electrical Engineer*. The three images are also taken from this book.

The ADB reference is at: <http://adb.anu.edu.au/biography/barton-edward-gustavus-campbell-9445/text16607>

For some brief information about early electricity usage in Brisbane go to: <http://www.itec.uq.edu.au/pes/early-electricity-usage-brisbane>

## Edward Gustavus Campbell Barton (1857 – 1942)



Edward Barton was born in Melbourne, the second son of an Irish barrister who had emigrated to Australia in 1852 and married a Scottish woman, a fellow immigrant, in 1854. The family moved to Dunedin in New Zealand in 1862. Barton attended school in New Zealand until he turned 14. He then travelled to Scotland, possibly by himself, and found employment in the engineering works and drawing office of Messrs Miller and Herbert in Edinburgh. Here he must have acquired a taste for academic engineering studies, because *in October 1875 he enrolled at the Karlsruhe Polytechnic Institute in Germany and commenced a four year course in engineering.*

He returned to Scotland and his previous employer in 1880, but he obviously had a strong interest in the pioneer discipline of electrical engineering. A year later he obtained employment with Siemens Brothers & Co Ltd – a famous German company which had moved to London in 1863 – as an assistant in their Electric Light Department. His experience with Siemens was short, but seminal to his future development. He took every possible chance to learn new things and left for New Zealand with a reference from

them *'We have been perfectly satisfied with the manner in which he has carried out his work in every respect .....'* He spent the next few years working as a consultant in New Zealand and Australia and settled in Brisbane in 1886 after being engaged as the Queensland Government Electrician.

Within two years he had resigned to set up Barton White and Co. with Cedric Francis White, with a small (very small) power station and factory in Telegraph Lane, Brisbane (later renamed Edison Lane to reflect their business). The first clients of this first public (commercial) electricity supply company in Queensland were the GPO building and the Gresham Hotel. The company was soon making or supplying and installing nearly every component which their clients needed to establish their lighting systems (incandescent globes were not made in Australia for a long time). Barton White & Co was renamed the Brisbane Electricity Supply Company and then the City Light Company in 1904.

By then, the little factory in Edison Lane had passed into history, replaced by a power station with a steam turbine in Ann Street, and Barton had acquired other interests, in politics, social service and technical education. He had been lecturing on electricity, electrical engineering and physics (then a branch of Natural Philosophy) at the Brisbane Technical College, and he became President of its Council in 1905. He was involved in *'the moves to create the University of Queensland and to ensure it included the study of Engineering'*. Barton contributed a vast number of advanced and sometimes novel ideas in technical papers to various learned societies, to most of which he belonged, including being a founder of the Institution of Engineers Australia.

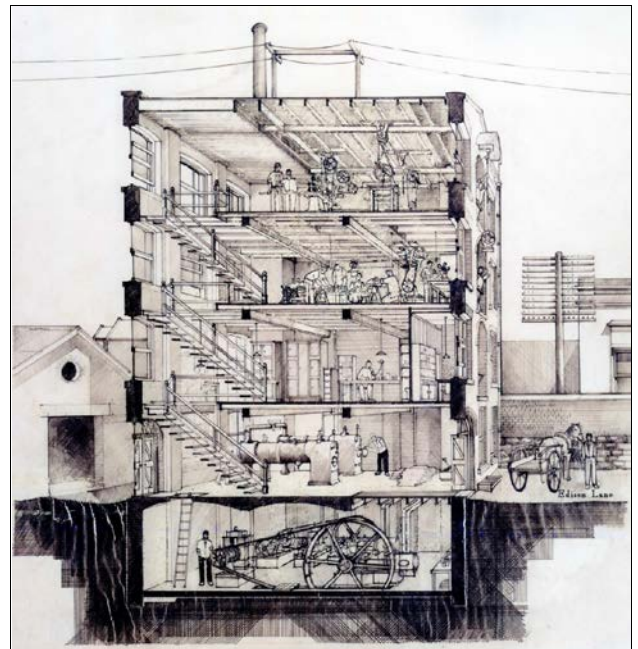
He left Australia in 1915 to work for the British Ministry of Munitions and later the Admiralty. After the war he stayed in England, and made his home there. Edward Barton died in England in 1942.

*Editor*

### The Barton White & Company Power Station and Factory.

This view of the power station and factory interior was drawn c1988 by Mark Whitmore for S.A. Prentice's book.. Also see the larger copy of this image on the cover. It shows, from the top:

- Roof: The top of the chimney from the boilers on the ground floor, and the wires and poles of the overhead electricity distribution system.
- Top floor: Fitters' [& Turners'] Shop – with overhead lineshafting probably operated by an electric motor on the floor. The cathead hoist outside the window is lowering a fan manufactured in the building.
- 2<sup>nd</sup> Floor: [assembly] Workshop – overhead lineshafting probably operated by an electric motor bolted at ceiling level near the far wall. The men appear to be assembling fans.
- 1<sup>st</sup> Floor: Offices and Stores – we see a man sitting at a table, talking on a telephone and working by electric light.
- Grd Floor: Two boilers, wood burning, 1000 lbs of water/hour evaporative capacity at probably 110 psi. The boilers appear to be sitting on a concrete floor. Note the pile of logs and the man stoking logs into the firebox. The horse & cart could have been delivering wood, or taking away finished fans.
- Basement: Said to be two Marshall steam engines and two Crompton dynamos, although it is doubtful if 2 sets could have fitted in the space. Note the ladder only access and the trench in the floor for the flywheel/pulley and belt, and the 'duckboard' allowing the attendant to duck through the gap. OH&S these days would have a blue fit!



# One Last Trip for the “City of Adelaide”



Clipper Ship, 'City of Adelaide', 1000 tons, David Bruce, Commander.  
Hand-coloured lithograph by Thomas Dutton, August 1864.

Dedicated "To Messrs. Devitt and Moore Owners, Messrs Wm Pile, Hay & Co. Builders & the Officers of the Ship this print is most respectfully dedicated by their obedient servant, Wm. Foster".

The world's oldest composite clipper ship, the *City of Adelaide*, is about to make one last trip to South Australia. This will be its 24th voyage. A composite clipper ship has timber planking applied over an iron frame. The key advantage of this method, for which the first patent was granted in 1849, was that copper sheets could be applied to the section underwater which inhibited the growth of hull-fouling organisms.

Without the need to constantly slip the ship for cleaning, the vessel could make faster journeys. In 1866 the *City of Adelaide* made the journey from Plymouth to Port Adelaide in the astonishing time of 70 days.<sup>1</sup>

The *City of Adelaide* was built in 1864 for the South Australian trade, taking immigrants and cargo to the Colony and returning with goods such as wheat, wool, and copper ore. It was half-owned by South Australians. The Adelaide firm of Harrold Brothers had a quarter-share and another quarter was held by Henry and Thomas Martin, the driving force behind the development of the Blinman copper mine.

Between 1864 and 1887 (the period generally considered to be the most significant in the ship's history), it made 23 voyages to South Australia.

The vessel was sold in 1887 and put to various uses in the Northern Hemisphere, including carrying coal and timber. It then served as a floating isolation hospital and was later taken to Scotland where it was converted to a training ship by the Royal Navy.



The City of Adelaide in Port Augusta in 1883

Photo courtesy State Library of South Australia

1 *SA Register*, Tuesday 16 October 1866, p2b





The City of Adelaide on its slipway at Irvine, south of Glasgow, in July 2013

Photo R.Venus

City of Adelaide Limited or CSCOAL). Their audacious proposal was to “deconstruct” the ship in one piece and bring it back to Adelaide. In May 2007 a devastating fire on the *Cutty Sark*, the only other surviving composite clipper ship, gave added impetus to the project.

In 2010 CSCOAL was announced as the successful tenderer but the Sunderland group SCARF (Sunderland City of Adelaide Recovery Fund) continued to promote the cause of keeping the ship in Britain, including occupying the ship in February 2012 to protest at its removal.

After sinking at its moorings in 1991, it was acquired by the Scottish Maritime Museum who mounted a £500 000 salvage operation. A number of restoration activities were carried out and a waterproof membrane was applied over the upper decks to provide weather protection.

Further plans for its restoration fell through and the *City of Adelaide*, minus its masts (which had been removed in 1990), then sat for 20 years on a slipway in Irvine, south of Glasgow.

In 2007 the slipway owner wanted the ship removed from the land which was zoned for residential development. The Museum could not move the vessel through narrow streets to its own premises and was left with two choices: transfer ownership or demolish it.

Approval was given in April 2007 for the *City of Adelaide* to be “deconstructed” in a manner which would at least yield archaeological information. The Museum called for tenders and two proposals emerged for its relocation: to Sunderland in England, where it was built, or to Adelaide in South Australia. Both locations are consistent with the Burra Charter principle that an item be retained and interpreted in a relevant setting.

In Adelaide, a determined group of volunteers formed the *City of Adelaide* Preservation Trust (Clipper Ship



Test assembly of the Adelaide's specially designed Shipping cradle in March 2012.

Photo Peter Roberts

Crucial to the South Australian proposal was the design of a transport cradle. This was carried out by Aztec Analysis, a subsidiary of Adelaide-based consulting engineers, Wallbridge & Gilbert, which specialises in heavy lifting and haulage. (Principal Mark Gilbert had cut his teeth on oil rigs in the North Sea soon after graduating.) A laser scan of the vessel enabled a precise 3D model to be created which allowed the cradle to be designed with millimetre precision.

South Australian engineering firms threw their weight behind the project and shared the fabrication of the cradle components. The sections were packed into five shipping containers and put together on site in Scotland for load testing and certification. This step was completed in March 2012. The 100 tonne cradle was then taken apart and reassembled under the vessel. Not a lot happened on site for the next 12 months but the project forged ahead in July 2013 when discussions began about the nitty-gritty of transport.



The shipping cradle reassembled under the Adelaide's hull in July 2013.

Photo R. Venus

Standing idly on the slip at Irvine, the ship had been turned into the world's biggest pigeon loft. A large team from Rentokil UK spent the best part of August thoroughly cleaning the ship inside and out. An inspector from the Australian Department of Agriculture Fisheries and Forestry was flown to Irvine to inspect their efforts and ensure the ship would meet quarantine requirements.

On its way out of the River Irvine, the *City of Adelaide* had to negotiate a curious footbridge with an opening centre section providing a gap of only 16.5 metres. *City of Adelaide* has a beam of 11 metres. Wind gusts stopped the first attempt but, with the aid of an additional tug, the bridge was safely traversed on Monday 9 September.



The Adelaide on its barge negotiates the opening in the footbridge near the mouth of the Irvine River, in September 2013. Photo Peter Roberts

The cradle with additional steel sea-fastenings was then welded to the deck of the barge to secure it for transport to London. It reached Chatham Docks on the River Thames on 25 September. Over the weekend of 18 to 20 October, the *City of Adelaide* went on public display at Greenwich, moored in front of the Old Royal Naval College, 200 metres or so from the *Cutty Sark*.

While everyone involved with the project has been referring to it as the *City of Adelaide* since 2001, the vessel was actually renamed the *Carrick* in 1923. It's a maritime superstition that a vessel can't have its name changed without a ceremony to appease the gods of the sea and winds. Doing so will ensure good luck at sea. This ceremony took place at Greenwich on Friday 18 October, in the presence of HRH Duke of Edinburgh.

The *City of Adelaide* was then sailed to Dordrecht in Holland where it was fumigated and wrapped for transport. The vessel is expected to arrive in South Australia sometime between February and April next year (2014).

There was a nervous moment after the 2013 Federal election when a promised contribution of \$850 000 towards the shipping costs was in limbo. However, in mid-October the new Government stated it would honour the commitment provided no further funding was sought.

The final sticking point is the location of its new home in South Australia. The heart of Port Adelaide is of great heritage and historical significance. There are three significant museums: the SA Maritime Museum, the Port Dock National Railway Museum, and the SA Aviation Museum. A key landmark is the 1869 lighthouse which originally stood at the entrance to the river and was

relocated at the water's edge in 1986. Two other historic ships are berthed at the Port: the *Falie* (a sailing ketch built in 1919) and the *One and All* (a replica "tall ship" based on a brigantine and built in 1985). Nearby is the steam-powered tug *Yelta* which was built at Cockatoo Island, NSW in 1949. These attractions are all within walking distance.

The original concept was that the *City of Adelaide* would become a significant attraction in this historic precinct. However, in a move described as "short-sighted" and "a monumental blunder"<sup>1</sup>, the State Government has offered land about five kilometres away. This leaves CSCOAL in a difficult position: while grateful for the offer of land, the Trust is also concerned that the location offered is not going to help achieve the goal of making the *City of Adelaide* a star attraction in a maritime heritage precinct. The Port Adelaide Enfield Council supports the central location and believes adding the *City of Adelaide* to the existing attractions could play a crucial role in the revitalisation of the central Port Adelaide district.

There is no intention to restore the *City of Adelaide* but simply to preserve it. (The full restoration of the *Cutty Sark* took six years and cost £50 million.) Millions of dollars have been spent to bring it to South Australia, the funds coming from the Scottish and Australian Governments and the generous donations of hundreds of individual supporters. It has many stories to tell, not the least of which is the present-day engineering that has been required to safely transport it. It would be a great pity if the presentation and interpretation of the clipper ship *City of Adelaide* is not done in a prime location.

Richard Venus, *Engineering Heritage SA*  
31<sup>st</sup> October 2013.



Richard Venus in the bow section of the City of Adelaide's lower deck.

Further information about the *City of Adelaide* is available from the Trust's website: <http://cityofadelaide.org.au/>

1 Advertiser, 19 October 2013, p75, 76a

# Ron Stewien – Railway Man



Railway and engineering heritage lost a key contributor with the death of Ron Stewien on 11 August 2013. Ron had been a railway man all his long working life, starting with the South Australian Railways (SAR) in 1950 as a youth labourer. His interest in engineering heritage began almost as soon as he joined the Railways. In 1951 he acquired a large number of glass negatives – he was chastised for unwarranted expenditure and had to pay for the negatives himself – money he would have considered well spent.

Ron graduated as a civil engineer in 1955 and was posted to Naracoorte to work on the conversion from narrow to broad gauge. These experiences were later recorded in one of Ron's early publications, *One Rusty Rail*. His first was a booklet for the 75<sup>th</sup> anniversary of the Peterborough railway workshops written in 1961.

From 1963 to 1972 Ron was Chairman of the Australian Railway Historical Society (SA Division) Book Committee which produced three volumes on the 500, 600 and 700 Class SAR steam locomotives as well as the restoration of the 620 Class broad gauge steam locomotive, the *Duke of Edinburgh*.

Ron's engineering specialty was track design. In 1963, he designed and project managed the track layout for Adelaide's Mile End Railway Museum. Following its relocation to Port Adelaide in 1988, it became the National Railway Museum in 2001 with Ron as a member of the Steering Committee.

Ron was a foundation member of the SA Division's Engineering Heritage Subcommittee, representing the State Transport Authority, and he remained an active member of the heritage committee for many years. In 2001 Ron prepared the nomination of the Trans Australia Railway for a National Engineering Landmark and was involved in planning the recognition ceremony at the Port Augusta railway station.

With the demise of the SA Railways in 1974 Ron became Chief Engineer of the State Transport Authority (later TransAdelaide). One of his projects was the design of the 2000 Class diesel railcars which provided fast commuter

services to Adelaide's expanding suburbs. He "retired" in 1989 but his skills were much sought after. He consulted on numerous projects including the Hong Kong Mass Transit system, the London Underground Railway (rewriting their manual for track maintenance), the Olympic Dam Expansion, and Australia's last great rail link – the Alice Springs to Darwin line.

When he finally "really" retired in 2007 he was able to turn his full attention to his *magnum opus*.

In 1965 Ron conceived a plan for a comprehensive history of the South Australian Railways. At first he thought it would require six volumes but this soon grew to ten and later eleven when he realised he had a wealth of material on the Islington Railway Workshops and their role in World War Two.

The work was planned in such detail that, after finishing Volume 1 in 2007 (co-authored with Malcolm Thompson), he could skip ahead to publish Volume 6 in 2010 followed by Volume 5 in 2011. However, Ron ruefully acknowledged some years ago that he was unlikely to finish the task he had set himself and he hoped that some other person would come forward and finish the work.

At the time of his death, Ron was working on Volumes 2, 3, 4 and 7. His colleagues are hopeful that some of these volumes can indeed be completed and Volume 2, dealing with the extension of the rail network to the north of the state, might be published next year.

Ron's focus was not just on the physical artefacts: he also described the human dimension, providing the context and personal insights that bring engineering heritage to life. Highly regarded by his friends and work colleagues for his genial nature and willingness to share his extensive knowledge and experience, Ron will be sorely missed.

Ron's significant contribution over many decades to engineering heritage was recognised with the presentation of an EHA Award of Merit at the Sir Eric Neal Address dinner in Adelaide on 22 February 2012. Unfortunately Ron was not able to be present. However, it was most fitting that his wife Maureen accepted the Award on his behalf – as Ron had often said, she had always supported his professional and heritage activities. This Award was proudly displayed along with copies of his books at Ron's funeral service.

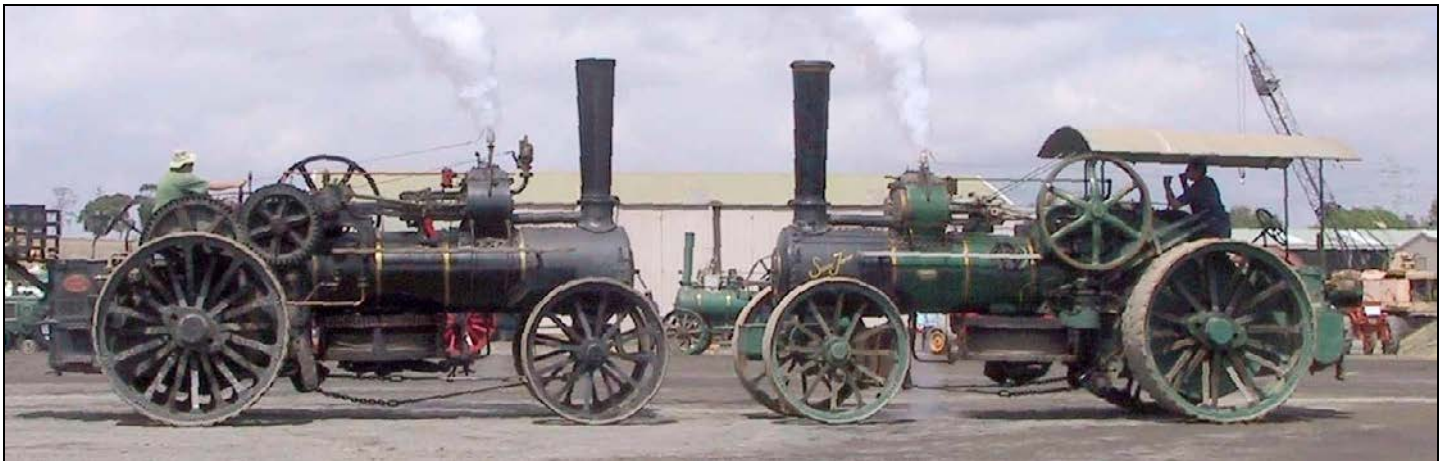
Ron died at home on 11 August. A railway man to the last, Ron's final wishes were that his ashes be scattered by the *Duke of Edinburgh* which regularly operates services for the SteamRanger heritage railway. Ron was involved in the significant restoration of the locomotive in the mid-1980s and chose its *Hawthorn Green* colour.

On Sunday 8 September the *Duke of Edinburgh* had a special passenger making his last journey.

*(with thanks to Richard Muncey and Peter Fehlberg)  
Richard Venus, Engineering Heritage SA*

# The National Steam Centre, Scoresby, Victoria

*Full steam ahead for 50 years*



Pair of Fowler Z7 ploughing engines at the National Steam Centre.

Image from the National Steam Centre website.

The National Steam Centre is a huge collection of steam, internal combustion and other iconic mechanical machinery assembled by the Melbourne Steam Traction Engine Club over the last 50 years. It is located at Scoresby in Melbourne's eastern suburbs. On 29 September 2013 Engineers Australia recognised the collection with an Engineering Heritage Marker and at the same ceremony a cake was cut to celebrate the 50<sup>th</sup> birthday of the Club.

The key significance of the National Steam Centre as far as Engineering Heritage Australia is concerned is the extensive collection of machinery and engines demonstrating many different technologies and applications in a time frame of more than 150 years. There is a strong emphasis on Australian made machinery and a particular selection of Victorian products.

Steam engines cover the whole range from portables to very large industrial engines. There is also a collection of large diesel engines along with early gas and oil engines which more resemble steam engines than contemporary internal combustion engines. There are some steam turbines and one gas turbine although this area of the collection could usefully be expanded.

Much of this machinery demonstrates special design features for particular narrow applications. For instance there is a superb "instructional" steam engine built for the Mechanical Engineering Laboratory of the Melbourne Working Men's College (now RMIT University). This machine was built by Marshall Sons & Co Ltd, Gainsborough, England in 1931. Such engines were fitted with an array of control devices and additional fittings to facilitate a wide range of thermodynamic tests.

Engineers Australia Federal Councillor Carla Cher represented Engineers Australia at the ceremony and spoke about the

Engineering Heritage Australia Heritage Recognition Program and the ongoing role of innovation in the world of engineering. She noted the significant number of patents marked on machinery of all ages from early Colonial times until the recent past to signal the intellectual property incorporated in the machinery.

Neil Meyers, President of the Melbourne Steam Traction Engine Club talked about the history of the club and its ongoing battle to recover unique machinery and preserve it. The Club always attempts to put machinery back into operation to maximise understanding of the machinery by visitors to the Centre. In fact the Club volunteers went around the museum just before the ceremony to turn off machinery to reduce the noise level during the ceremony.



1931 Marshall "instructional engine" from the RMIT Mechanical Engineering Laboratory.

Photo: Rohan Lamb

Neil also gave tribute to five of the Founding Members of the Club who were at the event and who took part in the cake-cutting.

The Club has many enormous challenges ahead of it but its performance over the last 50 years shows that it can achieve almost anything it sets its minds to. Each new project requires research, adaptation of the machinery to provide an eye-catching display as well as the hard work of stripping, restoring, rebuilding and painting the old machinery.

The Club has acquired the complete set of steam machinery from the 1939 New Zealand steam tug Lyttelton II along with several sections of the hull from the engine room area. The plan is to recreate the engine room with all its machinery in place to give visitors a realistic engineering picture of the age of steam ships.

Another project for the future is the restoration of a sugar mill engine which drove crushers at the Millaquin Sugar Mill in Bundaberg, Queensland. This large engine was manufactured by Walkers Limited at Maryborough, Queensland and is a clear demonstration of the capability of Australian heavy engineering industry in the past. When restored to steam operation this will be the largest steam engine operating in a public museum in Australia.

Perhaps surprisingly, there are still a number of reciprocating steam engines in operation driving crushers in Australian sugar mills. These engines are ideal for sugar mill driving as they have maximum torque at minimum speed which is essential to crush sugar cane at the very slow speeds utilised in the process. Efficiency is less important in this application as all the exhaust steam from the engines goes to heating applications in the complex sugar making process, following crushing and the extraction of the raw juice from the cane.

Another specialty area of the collection is a range of older machine tools, mostly for metal working, displayed in a workshop setting. The return to demonstration working of some of these tools could be a further development of the collection. In the modern world of automated manufacture answering the question "How was that made?" has become a more pressing question, particularly as modern machine tools are so heavily guarded for safety that it is close to impossible to see what it going on at the point where the cutting tool meets the metal.

The National Steam Centre is a great outing for those interested in heavy mechanical machinery. See the web site at: <http://home.vicnet.net.au/~mstec>

*Owen Peake  
Engineering Heritage Victoria*



The Millaquin sugar cane crushing mill, made by Walkers Ltd, Maryborough, Qld. Photographed while it was still working in Bundaberg. Photo: Bundaberg Sugar

# The start of a New Era in 1963

## The Ord River Diversion Dam & the Ord River Irrigation Project

On 20 July this year, a ceremony was held on the east bank of the Ord River, near Kununurra, Western Australia, to commemorate the award of an Engineering Heritage Marker to the Ord River Diversion Dam. The 20<sup>th</sup> of July was the 50<sup>th</sup> anniversary of the official opening of the Ord River Irrigation Project by the then Prime Minister Sir R G Menzies.

The New Era refers to the transition from nearly 80 years of pastoral use of the fertile Ord River valley to that of irrigation farming, which in turn followed 20 years of research into crops which could be grown if sufficient water was available.

In 1958 Prime Minister Menzies had made an election promise that if his government was re-elected, £5 million would be made available to the Western Australian Government for northern development, providing the money was spent by 1963. The Prime Minister believed that the WA Government would not be able to meet the time condition in respect of the irrigation project.<sup>1</sup> He was unaware that the WA Government was sufficiently advanced in its planning to allow construction of the diversion dam to commence in 1960. The irrigation project, of which the diversion dam was the centrepiece, was completed by early 1963.

Water from the small lake behind the diversion dam flowed into a main irrigation channel and thence to farms on the Ivanhoe Plain downstream. The town of Kununurra was established not far from the diversion dam site, and it serviced the later construction of the main Ord River Dam and Lake Argyle about 30 kilometres upstream.

West Australian Public Works Department (PWD) investigations prior to the detailed design of the diversion dam concluded that a maximum flood flow of about 57,000 cubic metres per second could be expected at the proposed site. It was unusual for a diversion dam to be built before, and without the flood protection of, a main storage dam further upstream. However the limited funding issue dictated that the main dam be built after the diversion dam and it wasn't completed until 1971.

The exact location of the diversion dam was decided by the fortunate occurrence of a quartzite bar (Bandicoot Bar) across the river on which the dam could be anchored, and this was also a convenient location to store water to reticulate to the proposed farm lots.

A civil engineering project of the scale of the Ord River Diversion Dam had never before been constructed in the north of the state. It had to overcome considerable communication, technical and logistics challenges. 41,000 cubic metres of reinforced and prestressed concrete, 650 tonnes of reinforcing steel and 240 tonnes of high tensile prestressing steel were required to construct the spillway,

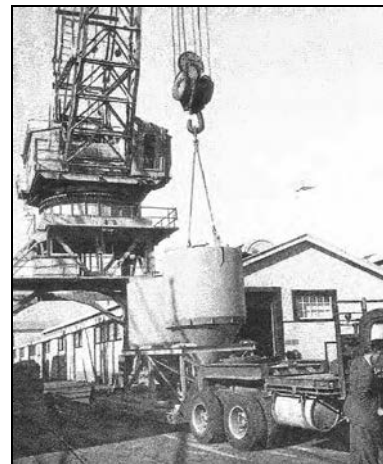
abutments and the piers which supported 20 steel radial gates each weighing 95 tonnes. All of this material, plus staff, living quarters, site offices, workshops, a concrete plant and so on, and on, had to be moved to an extremely remote site – 3000 km by mostly unsealed road from Perth. And adverse seasonal climatic conditions with wet season flooding curtailed work in the river bed from December to March.



The Bandicoot Bar on the Ord River in late 1960, before dam construction started. Site offices, workshops and a concrete plant are visible on the East bank. Photo courtesy J. Lewis.

Prior to engagement of the construction contractor the PWD WA had established the town of Kununurra, 4 km from the dam, with site access roads, a town water supply, a power station and an airstrip suitable for small planes.

Mobilisation of the contractor's accommodation, offices, workshops, concrete plant and some preliminary work in the river bed started in late 1960 but most of the construction took place in the 1961 and 1962 dry seasons.



Transferring bulk cement into SS Dulverton at Fremantle Wharf.

Photo courtesy Christiani & Nielsen.

A feature of the logistics was the conversion of the State Shipping Service vessel *Dulverton* to a bulk cement carrier and a total of 15,000 tonnes of cement was shipped in cargoes up to 1400 tonnes on each voyage from Fremantle to Wyndham, where it was stored in silos before being carted by road to the site.

<sup>1</sup> According to John Lewis, who from 1954 to 1964 was the Public Works Department WA Engineer for Planning, Design and Investigation, Hydraulics Section

The majority of detailed design of the concrete, mechanical and electrical works was carried out by the PWD WA staff. However a key feature of the operation of the diversion dam was the radial gates used for storage and flood control. John Lewis had visited a dam equipped with radial gates in Montana USA in 1952, when on an overseas study tour. Contact with the designers, the US Bureau of Reclamation, resulted in the drawings of the Montana dam gates generously being provided free of charge. A major contract, valued at £763,000, for the prefabrication and trial assembly of the radial gates in Perth, was awarded to Perth firm, Vickers Hoskins Pty Ltd.



Radial gates trial assembled in Vickers Hoskins' Perth workshop.  
Photo courtesy Water Corporation of WA.

Tenders for the construction of the diversion dam were called in the first half of 1960 and the successful tenderer, Christiani & Nielsen Australia – Clough joint venture (CNC), was awarded a £2.9 million contract in July 1960. Contract completion was to be 30 November 1962. This was the first major civil engineering contract let by the PWD WA to private enterprise.



Rock excavation at Bandicoot Bar, protected by a temporary upstream levee.  
Photo courtesy Christiani & Nielsen

CNC completed the concrete work by 30 November 1962 but the painting of the gates was not completed until early 1963. Work had continued during the 1962–1963 wet season by placing the maintenance stop logs upstream of the gates thus allowing work to continue on individual gates although the dam was storing water.



The diversion dam in early 1963. The dam is storing water & gate painting is in progress..  
Photo courtesy Kununurra Historical Society.

The gates were fully completed on 8 March 1963 and the dam was officially opened by the Prime Minister of Australia, the Right Honourable Sir Robert Menzies, on 20 July, 1963.  
Photo courtesy Kununurra Historical Society.



Opening of the diversion dam in 1963 enabled the development of a major agricultural industry in the region, accompanied by the growth of towns & communities. It led to important decentralisation of agricultural production in the state, reducing the reliance on produce delivered to northern districts from the south-west or imported from other states. The irrigation scheme was improved with completion in 1971 of the larger Ord River Dam, further upstream, which produced the massive storage reservoir Lake Argyle.

An Engineering Heritage Recognition ceremony was held on the 50<sup>th</sup> Anniversary of Menzies' opening of the diversion dam – on the 20<sup>th</sup> July 2013. The ceremony was attended by over 50 guests, including former PWD and Christiani Nielsen Clough staff members (or relatives) who had been associated with dam's design or construction. An interpretation panel describing the planning, design and construction of the dam was jointly unveiled by the Chairman of the Water Corporation of WA, Ms Eva Skira, BA(Hons), MBA, and the President of EA WA Division, Mrs Helen Pedersen, FIEAust, CPEng.

*From Don Young, EHW/A.*

Ms Eva Skira (left)  
and  
Mrs Helen Pederson  
(right)

Photo by Emily Hunter



# The Overland Telegraph

## The Northern Division of Engineers Australia Celebrates Joining the Wire

The joining of the Overland Telegraph Line near Frews Ponds, 700 km south of Darwin on 22 August 1872 was the culmination of arguably the most ambitious engineering project of the 19<sup>th</sup> century in Australia.

The 3178 km link between Darwin and Adelaide brought communication times between England and Australia down to a few hours. Prior to this the only communication was the mail carried by ships which typically took three months to make the journey from England to Australia.

One hundred and forty years to the day later a group of engineering heritage enthusiasts, including Julian Todd the great great grandson of Charles Todd, the man responsible for the building of the Overland Telegraph Line for the South Australian government, celebrated the anniversary with an informal ceremony at the obelisk which commemorates the joining, on the side of the Stuart Highway, 1.6 km east of the actual joining point. The ceremony included the unveiling of an Engineering Heritage National Landmark marker and an interpretation panel telling the story of the joining. The unveiling was carried out by Julian Todd and Northern Division Director Bronwyn Russell. A toast was drunk from insulators from the line and a 21 gun salute was fired (with appropriate fireworks rather than the Colt revolvers used in 1872).



Bronwyn Russell & Julian Todd unveil the interpretation panel and marker at the Obelisk, 27km south of Dunmarra. Photo: Owen Peake

The previous evening a celebratory dinner was held at Dunmarra Roadhouse including re-enactment of some of the historic speeches, a competition involving the building of a model of the telegraph line and a presentation by Earl James of material on his 1984 survey of the line. Gary Frost, who runs the roadhouse, put on a special spread for the event. On the morning of the ceremony a work party drove down to the obelisk and erected the interpretation panel mounting frame. Trevor Horman, NT representative on the

EHA National Board then led us out onto Hayfield Station to inspect Frews Ponds where Robert Patterson and his men were camped at the time of the line joining. We came across Brad, Manager of Hayfield, at their Centre Yard, mustering cattle.

After the ceremony the group did some bush bashing with the four wheel drives in the convoy and visited the actual joining point located in a 52 pole segment of near-original line which has been preserved. This part of the day was led by Eddie Weber who is local representative of NT Parks and Wildlife and has been responsible for keeping the line segment maintained.



Owen Peake, Julian Todd, Trevor Horman & Richard Venus (EHA rep from SA) at the Joining Pole of the Overland Telegraph.

Todd and his team built the line in just 15 months through mostly unsettled country only explored 10 years previously by John McDouall Stuart. The line construction required the erection of 36,000 poles which carried a single strand of iron wire. Twelve telegraph stations were constructed between Darwin and Adelaide. Many of these became the nucleus of the present-day towns spread along the route which is now best known as the corridor of the iconic Stuart Highway - "The Track" as the people who live along it say.

The completion of the project was delayed by the 1871/72 Top End wet season leaving a section between the King River, south of Katherine, and Tennant Creek incomplete at the time of the contract deadline on 31 December 1871. Todd blazed an alternative supply route up the Roper River and across country to the vicinity of present-day Mataranka to get the line finished in August 1872. The savage liquidated damages for late completion were, however, avoided by the failure of the privately-owned submarine cable between Darwin and Java. When the cable was repaired the first telegraph traffic between London and Adelaide occurred on 21 November 1872 ending Australia's isolation forever.

Owen Peake



# The Overland Telegraph

## Some Background about Telegraphy and about the Overland Repeater Stations

[From the Editor]

Owen Peake has given us a great story about the marking ceremony for the Joining Point of the Overland Telegraph, but after reading it I had a whole lot of questions – not so much about why or how the Overland Telegraph was built – I remember studying that at school. My questions were about how and why electrical telegraphy actually worked. I hope the electricals in our audience will forgive me for my ignorance.

In the early part of the 19<sup>th</sup> Century, the quickest way to get any message across country in Australia was by horse, or by ship around the coast, or by railway train inland if one existed. Visual telegraphy, using semaphore stations, had been useful in Europe from the end of the 18<sup>th</sup> Century, but there the settlements were very close together compared to Australia. The semaphore stations had to be in line of sight of the next station and closer than 30km apart.

After the Americans Morse and Vail invented the Morse Code in about 1837, optical telegraphy via flashing light sources became viable, although the distance light beams from a source could be thrown and understood was still about the same as the semaphore. The uses were mainly military: the navy used signal lamps (originally oil or kerosene lamps with a focussing lens) from ship to ship; the army commonly used heliographs, which required no power source but a sunny day. The first practical heliographs were used by the British army Signal Corps in India in 1869. It may seem unlikely, but heliographs were still being used by the Australian Army in WW2 in Libya and Egypt and the Lebanon. They could be particularly useful in situations where a field telephone wire couldn't be laid.

The Morse Code signalling alphabet was developed by Morse and Vail to make their electrical telegraph invention viable. A Morse Key was used by an operator to open and close an electrical switch to send a signal via an intermittent DC current along a single wire with earth return. The first uses of this required the receiver to read messages marked or punched onto paper tape, but the tape was soon overtaken by an aural system, whereby the receiver could listen to the clicks and translate them into words, or, at a repeater station, send the signals on to the next station.

In the 19<sup>th</sup> Century, the limiting distance for a signal sent over the 8 gauge galvanised iron wire used in Australia was about 250-300km, hence the need for many repeater stations over the vast distances of the outback. Because there was no mains electricity to power the line, each station had to have its own power supply. In early days, this was provided by large numbers of glass cell batteries, called Meidinger cells<sup>1</sup>. Each of these batteries operated at about 1.5 volts, so at least 80 fully charged cells plus spares would be needed to supply the 120 volt Overland Telegraph system. The cells contained zinc and lead plates, magnesium

and copper sulphates, and water – all inside a glass tank with a glass “balloon” set in it. The batteries are said to have kept their charge “for a long time”, whatever that means. Presumably they could be recharged by replacing the chemicals or the plates, but breakages must have been a frequent problem. And imagine the logistics of transporting all that glass, lead, zinc and chemicals on camels!

The repeater stations on the Adelaide to Darwin Overland Telegraph Line were mostly the pioneer settlements of their regions. The nominal staff for these stations was two telegraphists and four linesmen, but they would have been backed up by cooks and stable hands and labourers and carpenters and later probably wives and children. These were the settlements around which the villages such as Alice Springs grew<sup>2</sup>. They were supplied once a year by camel train, but they had to develop their own water supplies and grow their own fresh food if they wanted to survive on more than variations on the theme of



The Alice Springs Repeater Station in 1880

From State Library of SA

bully beef and damper.

Not all the luggage was carried all the time by the ships of the desert. Charles Todd bought the steam paddle tug S.S. Young Australian in Adelaide, and it was sailed around the coast and up the Roper River 100 km to establish a freight depot which could overcome some of the problems caused by the Top End wet season. The Young Australian never returned to Adelaide – it was grounded in the Roper River in a towing mishap after the Telegraph line was completed, and there it remains to this day. The wreck was awarded an engineering heritage marker in May 2011.

The Overland Telegraph as a whole had been awarded an Historic Engineering Marker in 1999 and the Overland Telegraph line “Joining Point” was recognised in June 2012. Documents relating to all three can be found at: [https://www.engineersaustralia.org.au/heritageregister/search?type\\_id=1727&submit=Search](https://www.engineersaustralia.org.au/heritageregister/search?type_id=1727&submit=Search)

1 A cross-section drawing of a Meidinger cell is at: <http://www.travelling-australia.info/Infsheets/Overtelelect.html>

2 A photo of the Alice Springs station restored is at: <http://www.travelling-australia.info/CollASprings/APics2A.html>

# Remembering the Phoenix Foundry in Ballarat

## A Challenge for Heritage Recognition

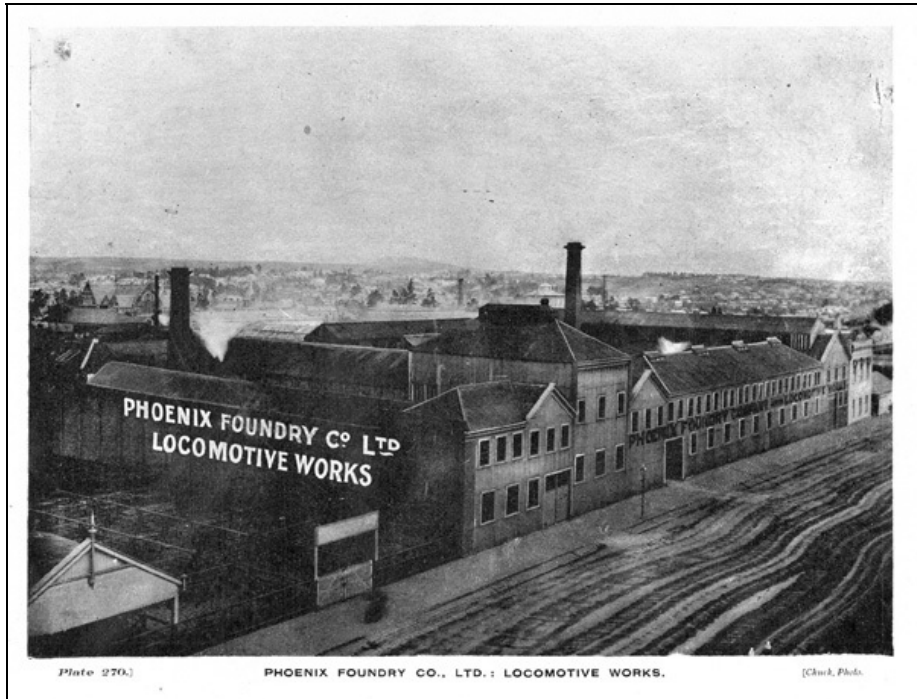


Plate 270.

PHOENIX FOUNDRY CO., LTD.: LOCOMOTIVE WORKS.

[Clark, Photo.]

On 12<sup>th</sup> October 2013, Engineering Heritage Victoria organised a ceremony to commemorate the former Phoenix Foundry in Ballarat, Victoria with an Engineering Heritage Marker outside the site of the former foundry.

The Phoenix Foundry was one of Australia's largest and most successful manufacturing enterprises in the late 19<sup>th</sup> century. It became a large manufacturer of railway locomotives during a period when there was a national mindset to built machinery in Australia. The result was a rapid growth in manufacturing capacity and an increase in the quality of locally manufactured machinery to the point where local factories often produced better made and more appropriate products than imported equivalents. Much machinery was also exported.

The challenge for the Heritage Recognition of the Phoenix Foundry is that virtually all trace of the huge works have disappeared as the Ballarat CBD evolved over more than a century since the foundry closed. Engineering Heritage Victoria focussed on a modest concrete foundation for a railway turntable in Armstrong Street, just outside the factory door. This foundation had been preserved years ago by the vigorous efforts of local enthusiasts and is incorporated in a retaining wall in the street. This

foundation is the only remaining relic of the foundry infrastructure although several products from the foundry have survived including five locomotives and a large stationary steam engine.

The Phoenix Foundry was a very significant manufacturing business during its fifty years of operation. It was one of reputedly forty foundries in Ballarat during the heyday of manufacturing in Victoria in the 1880s. Phoenix Foundry was one of the largest foundries in Ballarat although there were other large enterprises including the nearby Union Foundry.

The Phoenix Foundry started up in 1856 to manufacture mining machinery. It produced steam engines to drive mining machinery, stamping mills and other gold extraction machinery during its first fifteen years of operation.

In 1871 it received its first order for steam locomotives from the Victorian Railways and by 1873 the first locomotive had been completed. Over three hundred locomotives, of many different classes were subsequently produced.

As a result of a Victorian Government decision to manufacture locomotives in the Victorian Railways workshops in Newport, Melbourne, the directors of the Phoenix Foundry entered into voluntary Liquidation in 1905 and the foundry closed its doors in 1906.

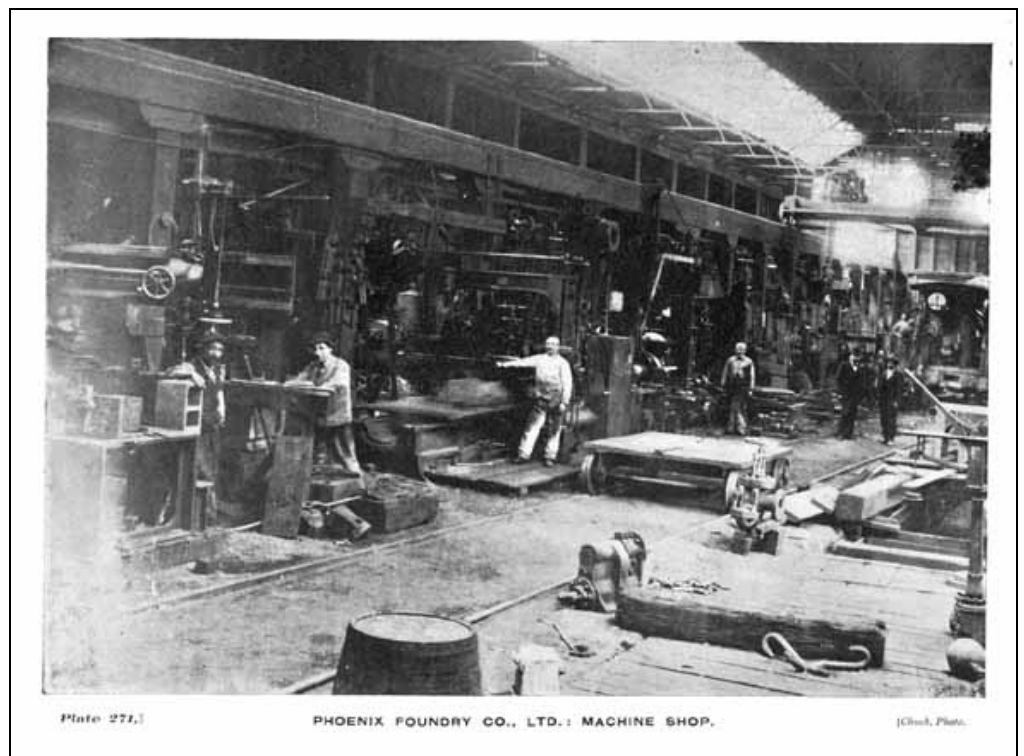


Plate 271.

PHOENIX FOUNDRY CO., LTD.: MACHINE SHOP.

[Clark, Photo.]

## After the Phoenix Foundry

Within a few years of the Phoenix Foundry being driven out of business, the Newport Railway Workshops were working at capacity, other manufacturers were persuaded to build locomotives for the Victorian Railways and many locomotives were imported. There was a boom in railway construction in the period between about 1910 and the beginning of the First World War. At the same time, the fleet of old locomotives in the Victorian Railways was replaced by newer engine designs with an emphasis on lower maintenance costs.

However despite the demise of the Phoenix Foundry, Ballarat continued, and continues today, to be a centre of manufacturing industries. This fact was amply demonstrated immediately after the Heritage Recognition ceremony as the ceremony attendees visited two modern manufacturing plants in Ballarat.

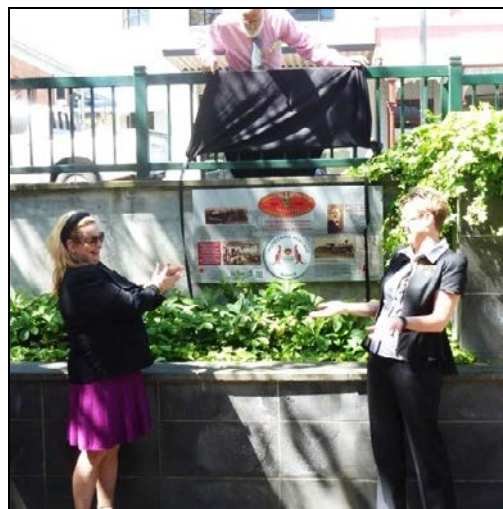
Gecko Industries manufacture mineral extraction plant to a worldwide clientele. Their machinery, primarily centred on gravity separation of minerals, has an emphasis on reducing the energy input to mineral processing. Albins Performance Transmissions manufacture automotive gearboxes for the motor racing community. Apart from manufacturing the gearboxes for all the V8 Supercars they export to a number of motor sport sectors, particularly in the United States.

The complexity and competence of these two manufacturers, both exporting highly sought after products to the world from back streets in industrial parks in Ballarat, shows what can be done in Australia, let alone in Ballarat, a city which did not die when the Gold Rush was over.

## The Ceremony

Local enthusiasts, Engineers Australia members attending the Ballarat *Regional Engineering on Show* weekend event, and other guests assembled in Armstrong Street on 12<sup>th</sup> October 2013 to celebrate the success of Phoenix Foundry in the past and the continuing success of Ballarat as a manufacturing centre from those early days right up to the present. An interpretation panel incorporating an Engineering Heritage Marker was unveiled. Chair of the Engineers Australia Ballarat Group Henk DeDeugd was the Master of Ceremonies and speeches were made by National Councillor Madeleine McManus and Ballarat Councillor Vicki Coltman.

*Owen Peake  
Engineering Heritage Victoria*



Madeleine McManus, Owen Peake & Vicki Coltman.

The images on the previous page, of the Phoenix Foundry buildings and the Phoenix Foundry Machine Shop, come from the Federation University Historical Collection – image numbers M6599-2 and M6599-1 respectively. The photo above, of EA Councillor Madeleine McManus, EHV Chair Owen Peake and Ballarat Councillor Vicki Coltman after the unveiling of the Plaque and Interpretation Panel, was taken by Miles Pierce.

Anyone who would like to find out more about the Phoenix Foundry or Victorian made steam locos may be interested in a recent book – *The Phoenix Foundry - Locomotive Builders of Ballarat - The History of a Ballarat Engineering Company*, by Robert Butrimis and David Macartney, published by the Australian Railway Historical Society (Victoria Division Inc.). This hard cover, landscape format book is crammed full of well captioned and beautifully reproduced historic photographs – of the Foundry's and Railway work and workers and (mostly) the locomotives they built and drove and maintained. Part 1 of the book, *The Foundry and its Products* is a history of the Foundry set against the development of Ballarat. There is very little information about the foundry's products other than locomotives – not surprising perhaps considering the publisher. Part Two – *The Locomotives at Work*, is all about the different designs of locos built by the company and how they were used. The appendices include a list of railway contracts, the specifications for various types and designs of locos, lists with basic details and history of practically every loco ever built by the company, a chapter by chapter bibliography and an index. This note is not pretending to be a review of the book – we have not had time to read it yet, but we can say it is a visual feast, and a treasure trove for any fan of steam locomotives. The image reproduced below is from the front dust-jacket of the book. It shows: Phoenix-built R 305, surrounded by friends and admirers at Lilydale in the late 1880s.

The book is available via the following website: <http://www.arhsvic.org.au/index.php/publications-sales/books>

[Editor]



# The Julius Tote & its Outstanding Engineer

Last August 19<sup>th</sup> at Ascot, a suburb of Brisbane, Engineering Heritage Queensland joined with the Heritage unit of the Brisbane Racing Club and the Thoroughbred Racing History Association, in the Tote building at Eagle Farm Racecourse for an unusual technical presentation – *A Man and his Machine*, the Man being Sir George Julius and the Machine his Totalisator.

The year 2013 marks the centenary of the installation of the first Julius Tote at Ellerslie racecourse in New Zealand. Another of these Totes – the third in the world – was installed at Eagle Farm in 1917. A different Julius Tote, and presumably more up-to-date model, replaced the 1917 Tote in the same Tote building at Eagle Farm in about 1947/48. Years later, when the Julius Tote was replaced by a computerised system, the race course management found a new use for the building instead of demolishing it, as happened so often elsewhere.

On the ground floor, underneath the tote machine room, was the long room with about two dozen small windows along one side, where tote clerks took the bets of racegoers and entered them into the totalisator. This room was converted to a banqueting hall and the tote machinery upstairs became the main feature of a race course museum. It is thought to be the only such tote surviving anywhere in Australia.

The presentation *A Man and his Machine* was a great success, attended by about 50 people. The MC and first speaker was David Gibson, the Chief Archivist and



The New Farm Tote building in 2012

Photo P. Coghlan



Tony Shellshear with his great-grandfather's 1830 lathe

Photo B. McGrath



Viewing the Julius Tote, August 2013

Photo B. McGrath

Historian for the Brisbane Racing Club, which maintains the Museum in the former Tote Building. The next speakers were Paul Coghlan, a member of EHA(Q), who spoke about the inventor and manufacturer of the Tote, Sir George Julius, and then Kerry Woodluck, of the Brisbane Racing Club Heritage Unit.

Tony Shellshear, the principal geologist of Geological Data Design, and Sir George Julius's great-grandson, brought along his great-grandfather's personal lathe, dating from 1830. I suspect that this treasured lathe was probably handed down to George by his father, clergyman and later Archbishop Churchill Julius, who was well known for his mechanical skills and his home workshop.

## The Outstanding Engineer

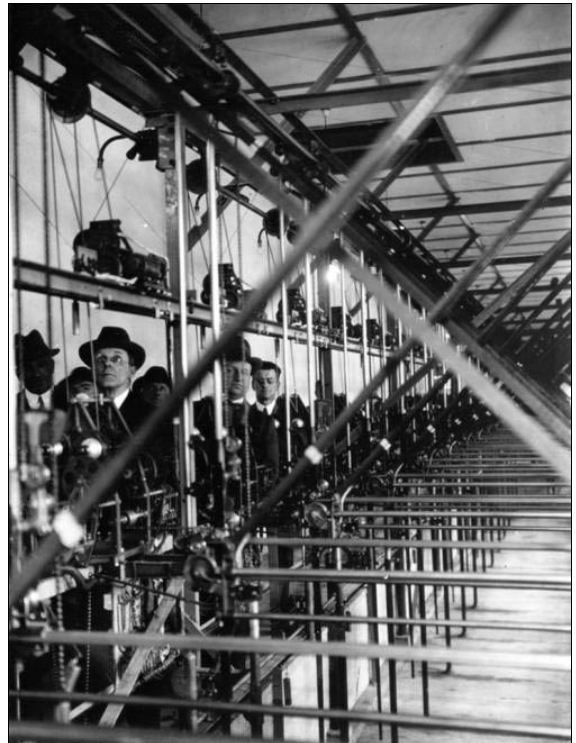


George Alfred Julius was born in 1873 at Norwich in England. His father was a Church of England clergyman who took his family to Australia when George was still a young boy. In 1890, when George was 17, Julius senior was appointed Bishop of Christchurch, New Zealand. George went to New Zealand too and studied engineering at Canterbury College. He graduated B.Sc.(Mech.Eng.) in 1896 and almost immediately returned to Australia where he obtained a position as assistant engineer in the West Australian Railways. By the time this multi-skilled polymath<sup>1</sup> was ready to spread his wings and fly to Sydney in 1907 to take up a (very) highly paid position with timber merchants Allen Taylor & Co, he had already invented and sold a *foolproof mechanical voting machine and published three important works on the physical characteristics and economic uses of Australian hardwoods*.<sup>2</sup>

He had started work on the design of his automatic totalisator before he left Perth, and he continued that in his own home workshop in Sydney, where he also built such things as a model city and a model railway with steam locos for his children. The totalisator was ready to go in a few years and he sold the first to the Ellerslie Race Course in New Zealand in 1913. He soon formed the company Automatic Totalisators Ltd and gradually built his market until he was selling his totes all around the world, wherever horse racing was popular. His totes remained in demand, because he believed in continuous improvements in design and he produced significant improvements in each new model.

If the enormously successful totalisators were Julius' only claim to fame he perhaps would not deserve the title polymath, but a list of some of his achievements shows what an extraordinary man he was. In about 1908(?) he formed his own consulting engineering practice. He built this up over the years and took in partners William Poole and in 1922 A.J. Gibson. The well known firm Julius Poole and Gibson thrived and survived long after the original partners had died or retired. The name survives to this day. Many of its achievements are listed in the fascinating archive held by the Powerhouse Museum in Sydney.<sup>3</sup>

Personally, at various times, Julius was president of the Engineering Assoc. of NSW; the Electrical Assoc. of NSW; a founder of IEAust and president in 1925; a founder and later chairman of the Australian Commonwealth Engineering Standards Association; chairman of the Standards Association of Australia from 1929-39; and president of the Australian National Research Council 1932-37. In the 1920s and 30s he served on committees inquiring into or reporting on electricity supplies, water conservation schemes in north west NSW and the break of gauge in the railways. He was appointed the first Chairman of C.S.I.R. and remained so from 1926 until 1945. The list goes on and on. More details about his life and achievements can be found in the entry about Julius in the Australian Dictionary of Biography.<sup>4</sup>



Sir George Julius inspecting the Tote at the VRC Machine Room, Flemington Racecourse, in 1931.  
Image from the Rutherford Journal, NZ.

1 Wikipedia – A polymath is a person whose expertise spans a significant number of different subject areas; such a person is known to draw on complex bodies of knowledge to solve specific problems.  
2 Australian Dictionary of Biography – Sir George Alfred Julius.

3 <http://www.powerhousemuseum.com/collection/database/?irn=10954>

4 <http://adb.anu.edu.au/biography/julius-sir-george-alfred-6890>

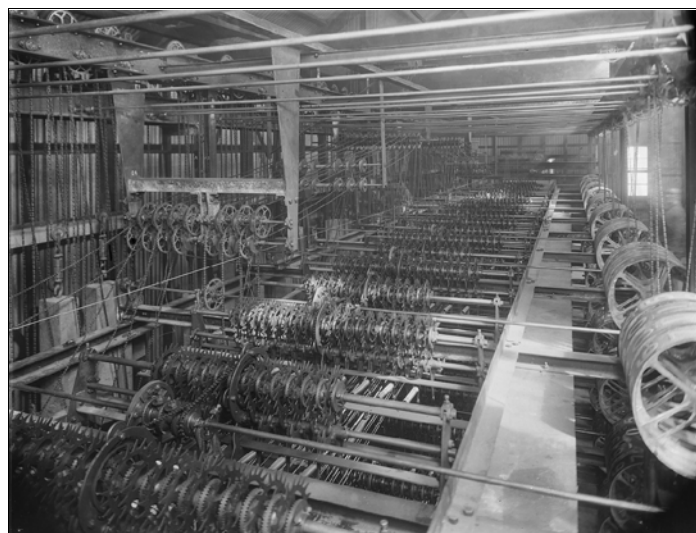
## The Julius Totalisator

This wonderful machine was probably the first really commercially successful application of a computing machine since the one created by Charles Babbage, in 1822. Some meanings of the word totalisator are – a machine for computing bets made on races and a computer that registers bets and divides the total amount among those who won. Another is a machine that registers bets and shows the odds at which all starters in a race stand at any moment. Simple definitions for an infernally complicated machine that took up a whole floor of a building dedicated to its use.

Providing a satisfactory description of how an electrical/mechanical automatic totalisator works, such as the one at Eagle Farm, is beyond my capabilities. For technical descriptions of the machines, there is plenty of information on the following websites:

<http://www.cs.auckland.ac.nz/historydisplays/SecondFloor/Totalisators/FirstJulius/FirstJuliusMain.php> and  
<http://members.ozemail.com.au/~bconlon/efmuseum.htm>

In the 1890s when the young George Julius was working for the West Australian Government, he invented a 'cheat proof' mechanical vote counting machine. That didn't take off, but he used those calculations and design later as a basis or starting point for the design of his first totalisator. Apparently he had no particular interest in horse racing, but he knew that the French Pari-Mutuel betting system, used for many years on racecourses around the world, was increasingly expensive to operate – needing a huge number of clerks to take bets, record them, calculate the odds and work out who and how much got paid. Julius was sure that he could develop an automatic machine that could record the bets, calculate the odds and work out the payouts. Of course a number of clerks would still be needed to take the money from punters, issue the betting slips and hand out the winnings, if any. But nearly everything else would be done automatically.



View along the top plane of the 1913 first tote, assembled in Sydney.  
Phot courtesy the Powerhouse Museum

Julius was still working on his invention after he moved to Sydney in 1906, and there he started his own consulting firm. There he also *set up a new workshop, where he continued to work on his tote, a maze of wheels, cogs, piano wires and lead weights*. There was still a lot of work to do, and it was not until 1913 that he sold his first fully operative machine to the racetrack at Ellerslie in Auckland, New Zealand. The first racecourse in Australia to buy an automatic tote was Gloucester Park in Perth, in 1916, and soon after totes were installed in Sydney (Randwick?) and New Farm, Brisbane.

He set up a manufacturing company *Automatic Totalisator Ltd*, and continued to work on improvements to the design of his totes. By the 1940s, Australian designed and manufactured totes were installed in just about every racetrack around the world, and most were still being used up until electronic totes supplanted them, many years later.



Front view of the first 1913 Tote, assembled for testing in Sydney before shipping to NZ. Photo courtesy the Powerhouse Museum, Sydney.

This story was compiled from information provided by Brian McGrath and Paul Coghlan of Engineering Heritage Queensland plus the websites noted above and a number of books from my Library, including *The Engineers: 200 Years at Work for Australia*, by Brian Carroll. The EA Queensland Division Heritage Committee is proposing to nominate the Totalisator for a national engineering heritage recognition award. Considering the world-wide success of this Australian invention, perhaps we should be thinking about an international award as well. ED.

# The Royal Engineers Building, Hobart.

Tasmania Division of EA will leave the historic Royal Engineers Building



The Royal Engineers Building in 2013

Photo - EA Tas Division

Engineers Australia Tasmania Division is about to lose its occupation of the historic Royal Engineers Building in Hobart. Tasmania Division, led by Henry McFie of the Heritage Group, was responsible for a fund-raising campaign to restore the derelict building in 1988, and has happily occupied it for 25 years. Many engineers have cherished the strong association of EA with this historic building, and will be disappointed to learn that EA's Tasmania Division is moving to a high-rise modern office in the CBD soon. The move has been encouraged by EA's National Office and, after an appropriate study, it now has Division Committee's support.

The Royal Engineers building has several deficiencies as a modern office related to its internal layout, lack of disability access, heating, stairs to the upper floor, etc. Its good points include ample free parking and room for Engineering Heritage Tasmania's (EHT's) library. These will be sorely missed. The new premises will have very little space for storage. EHT is faced with scanning two filing cabinets' volume of heritage records, and reducing its library of books to a few shelves. This is a major task for our little group. The scanned files will be stored on the local server and will hopefully be backed up on a regular basis.

*Bruce Cole, Chair, EHT, 22<sup>nd</sup> Sept. 2013*

## The Royal Engineers Building, Hobart. Its History & Heritage

The Royal Engineers first came to Tasmania (then Van Diemens Land) in 1835, led by Captain Roger Kelsall. They were responsible for the design and construction of military barracks, defence batteries, the major buildings at Port Arthur, hospitals and gaols, the early structures being built by convicts. In 1846-7 the Royal Engineers constructed a two-storey office block in Hobart, as part of their headquarters complex which included a parade ground, workshops, housing, stores, timber yard and jetty.

Justification for the building was likely made due to the enormous expansion of the role of the Royal Engineers

establishment in the 1840s as it then included the civil government works.

This handsome building is all that remains of the original establishment. It is constructed of solid brick and faced on the two most-visible sides with sandstone, which came from a quarry at Bellerive. Cement render hides the brickwork on the less visible sides. There were two large rooms on each floor, separated by a central foyer and staircase. An interesting feature is that two windows on the northwest (Domain) side are false, and only appear to be windows from the outside. The quality of materials and workmanship was first class, but the facing sandstone was subject to exfoliation due to the presence of montmorillonite clay.

The Royal Engineers tenure ceased in 1871 when they were withdrawn from the colony. In 1876 the building became the headquarters of the Tasmanian Mainline Railway. It continued in this role in 1890 when the government took over the railways until the 1930s. It then became the railways printing and stationery store. After the Australian National Railways took over the private Tasmanian Government Railways in 1976, the building was vacated, fell into disrepair and suffered damage by vandals. Some of the sandstone façade had eroded badly, giving the building a poor appearance, and demolition was proposed.

A careful inspection of the building fabric found it to be basically sound, and EA Tasmania Division, led by the Engineering Heritage Committee, launched a restoration appeal. Contributors included the State Government, the National Estate, Engineers Australia and members, APESMA, consulting firms and the public. \$300,000 was



The Royal Engineers Building in 1980

raised. External restoration consisted of re-roofing, replacing eroded or unstable sandstone, cleaning the sandstone, and landscaping. Cleaning stonework was a challenge as the surface was coated with black oil residue, algae and lichen. After testing, wire brushing by hand proved most effective. Internally the building was refurbished and repainted, and the re-opening took place in December 1986.

Its present occupants are the Tasmania Division of Engineers Australia and the Property Agents Board. The occupants share the meeting room and kitchen. A small room houses the Engineering Heritage library and archives.

*from EA Tasmania Division.*

A paper about the building, presented by PE Spratt to an Engineering Heritage Conference in Hobart in 1992, is at:

[http://www.consuleng.com.au/Tas%20Royal%20Engineers%20Building%20\(Spratt\)%202001.pdf](http://www.consuleng.com.au/Tas%20Royal%20Engineers%20Building%20(Spratt)%202001.pdf)

# Clydebank's Titan Crane

## An International Historic Civil and Mechanical Engineering Landmark

In May 2013 EHA was invited to participate with ICE PHEW (Institute of Civil Engineers Panel for Historic Engineering Works) in a ceremony to recognise the Titan Crane at Clydebank, Scotland, as an International Historic Engineering Landmark. The ceremony would be supported by four leading international engineering institutions - the American Society of Civil Engineers (ASCE), the Institution of Civil Engineers (ICE), the American Society of Mechanical Engineers (ASME) and the Institution of Mechanical Engineers (ImechE).



Clydebank in its heyday

From an old aerial photo

Keith Baker was planning to be in the UK at that time (20<sup>th</sup> August 2013) and he was happy to attend because he felt that it was in EHA's interest to be represented, and that it might conceivably assist with the protection of the threatened Hammerhead crane at Garden Island Naval Dockyards in Sydney.

The Sydney crane (built 1951) and the Clydebank Titan (built 1907) are two of only 13 such giant cranes (at present) left in the world. And how long before most of these have been demolished? Until fairly recently there were five such cranes still surviving at Clydebank alone. Now the Titan stands alone, like Shelley's King Ozymandias:

*"Nothing beside remains. Round the decay  
Of that colossal wreck, boundless and bare,  
The lone and level sands stretch far away".*

Look for Clydebank Titan on Google Earth and compare the desolation that surrounds the great crane in 2012, with the hives of industry and great ships under construction that can be seen in a 1945 "historical imagery" aerial view of the same site.

The Titan crane in Sydney is a prominent landmark in the Harbour, and a stunning visual reminder of Garden Island's past as a great naval dockyard – a dockyard whose structures and buildings are still part of the landscape (but for how long?). It was a forlorn hope that the recognised historic significance of the last remaining Clydebank Titan could influence the future of the Sydney Titan. On August 8<sup>th</sup> 2013, the Commonwealth Government announced, via the Parliamentary Secretary to the Minister of Defence, that the Crane would be removed from Garden Island (i.e. scrapped) and \$10.3 million would be provided to pay for the demolition. A sad reflection on this nation's blindness to the significance of its industrial history. *[Editor]*



The Hammerhead (Titan) Crane at Garden Island Sydney Harbour  
From the National Trust (NSW)

### Keith Baker represents EHA at Clydebank.

Three weeks before the ceremony I visited Clydebank to familiarise myself with the crane. I also corresponded with Prof Roland Paxton who was organising the event on behalf of PHEW, and I later attended a lecture he gave where he mentioned the Garden Island Crane in Sydney as an important link with the Clydebank Crane and its designer Sir William Arrol, although at opposite ends of the time scale.

The ceremony on the following day was a successful event with the American Societies of Civil and Mechanical Engineers and British Institutions of Civil and Mechanical Engineers combining with strong support from the West Dunbartonshire Council. A plaque was jointly unveiled.

It should be noted that the Titan Crane at Clydebank is no longer operational and has been modified with a lift to allow it to be used for bungy jumping. There is a Visitors' Centre, with a high level of interpretation, in a former drawing office near the base of the crane. The famous former John Brown Shipyard has been completely cleared to make way for a community college and further redevelopment. Remnants of a slipway near the edge of the river, the crane, and the photos in the visitor's centre are the only visible reminder of the huge industrial undertaking that built ships like the Queen Mary and QE2.

*From Keith Baker*



# *Clydebank's Titan Crane — the Wording on its Plaque.*

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## INTERNATIONAL HISTORIC CIVIL AND MECHANICAL ENGINEERING LANDMARK TITAN CRANE

### JOHN BROWN'S SHIPYARD, CLYDEBANK

Designed & fabricated in 1906-7 by Sir William Arrol & Co. Ltd., Glasgow, and Messrs, Stothert and Pitt Ltd., Bath,  
for lifting loads of up to 150 tons

Chief Engineer: Adam Hunter (1869-1933, MICE, MASCE)

On 24 April 1907, when tested with a 160-ton load at a radius of 85 ft [26 m] and commissioned,  
this 164 ft [50 m] high crane was the largest of the hammerhead type.

Its fixed counterweight and electrically operated hoists all mounted on the rotating beam, also made this crane  
faster and more responsive than its steam-powered predecessors.

It influenced the design of cranes of this genre worldwide and is now the earliest survivor.

Great ships fitted out at this basin included Aquitania, HMS Barham, HMS Hood, Queen Mary, Queen Elizabeth,  
Queen Elizabeth 2 and Her Majesty's Yacht Britannia.

Presented to Titan Clydebank Trust by

Institution of Civil Engineers

American Society of Civil Engineers

Institution of Mechanical Engineers

American Society of Mechanical Engineers

Dedicated: August 20, 2013



The Clydebank Titan Crane viewed from the water. The shafts for the stairs and lift built for the bungy jumping operation can be seen behind the tower. The visitor centre is the grey-roofed red building at the base of the tower. New college buildings are in the background.  
Photo Keith Baker

# Powering Perth – a Book Review

Powering Perth is the history of the East Perth Power Station, edited by Lenore Layman and published by Black Swan Press in 2011. The 300 page book is well illustrated with black and white images and contains 12 chapters written by a total of 13 authors.

The book is more than just the story of the power station as it gives a vivid picture of the area around the station where most of the workforce lived, worked and played.

The station started operation in 1916 and was retired in 1981. The book charts the changes in Perth, the local suburbs around the power station and in the power station itself over 65 years.

Old power stations are often knocked down soon after they close, sometimes to be replaced with an even bigger power station. In this case East Perth Power Station remains essentially complete 32 years after it closed. Unusually, most of its machinery remains intact making it one of the most important engineering heritage survivors of the Australian electricity supply industry. Some work has been done to restore the buildings of the station but as yet no adaptive reuse of the station has been found despite many interesting propositions having been floated. Whilst the station remains intact but not in use it is at risk and there is therefore considerable urgency to find an appropriate use for it.

Richard Hartley, well known for his engineering heritage writing and advocacy, wrote the 20 page chapter called “Technologies of Power” which tells the technical history of the station. This gives a good potted history of the power station itself. The station was a coal-fired steam power station of a fairly conventional type. It is of considerable interest to observe the many generations of progressively larger plant installed over the long life of the station.

The first three machines were just 4 Megawatts each ordered in 1913, followed by a 7.5 Megawatt machine in 1922 and a 12.5 Megawatt machine in 1928. There was then a considerable time gap to the next machine in 1938 which was 25 Megawatts and the final machine 18 years later in 1956 which was a 30 Megawatt machine. The first three machines were subsequently removed but the others, all manufactured by Parsons in the UK are still in place.

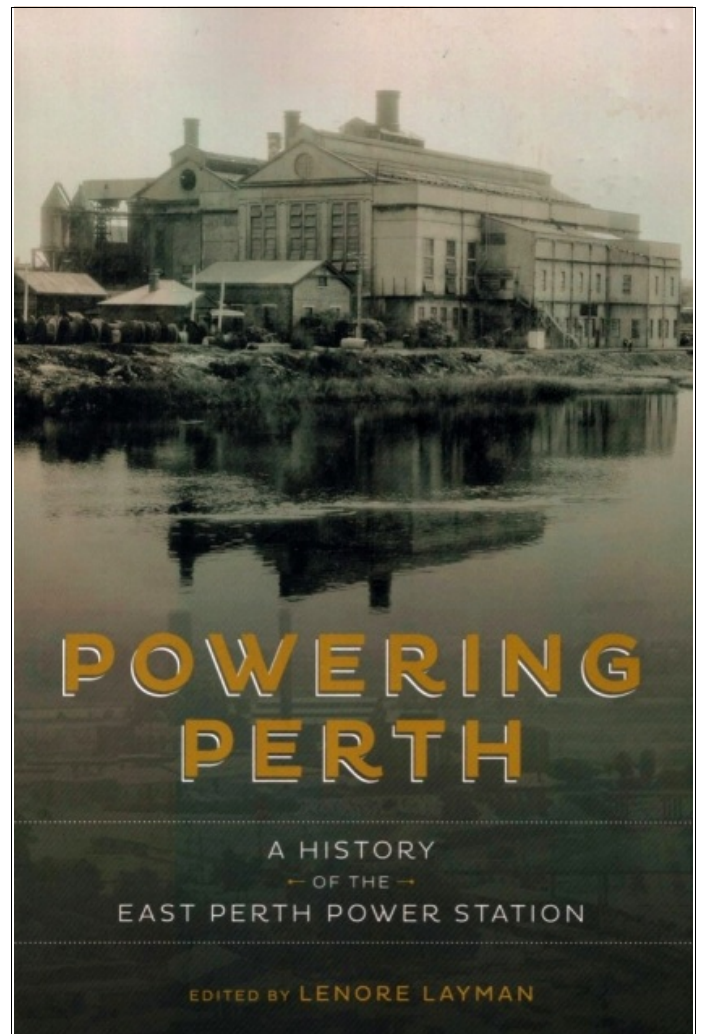
As an ex-power station engineer I was less than fully convinced by the picture painted of the working arrangements in the power station. The staff of power stations tend to form a very tight community as they deal with a dirty, noisy, dangerous working environment whilst being continually under pressure from off-site management to keep machinery running and squeeze more Megawatts out of the station. In my experience this leads to dedication, loyalty and mateship far beyond the norm in the community and unrecognised by those who don't really understand what a continuous struggle it is to keep a power station running.

On the other hand the word picture built up of the surrounding community, of which the power station was very much the centrepiece, was very convincing and provided considerable detail of the lives of the people in that community.

The enduring legacy of this book will undoubtedly be found in its excellent description of the wider power station community. However the book may also play a key role in helping to persuade governments that East Perth Power Station must be preserved. The editor and authors are to be congratulated for their contribution to engineering heritage.

Owen Peake

*Engineering Heritage Australia*



## Editor's Page

**A New Magazine:** First of all I would like to thank all those people who have contributed stories or information or images or ideas for the first edition of this new quarterly EHA Magazine. Constraints of time and space meant all could not be fitted in, but be assured, I will be able to use the material in future editions. I had 3½ months to collect material, research it, edit it, write much of it, and design a completely new magazine from the ground up. I really needed six or seven months – but here it is. With so many ideas already at hand, I will have some time for ironing out glitches before the next issue. I was hoping to have at least one story from each division ready for this issue. Unfortunately this didn't quite happen, but Sydney and Newcastle Divisions will get the earliest attention next issue.

**EHA Canberra Conference (17<sup>th</sup> - 20<sup>th</sup> November 2013):** I was pleased to be able to attend the conference as an observer. I got to Canberra just in time for the Sunday evening reception – a great networking opportunity and plenty of delicious finger food – just what I needed after a 6-hour drive. Altogether the conference was a great opportunity to meet old friends and make new ones. The excellent keynote speaker on Monday, the nation's Chief Scientist, Professor Ian Chubb AC, opened the program talking about *The role of Science and Engineering in National Development*. That might have been an appropriate alternative conference theme if he had been talking about past development. He wasn't – he was more concerned about the possibilities of future development – or the lack of possibilities. I wish I had a transcript of his speech for you. It hit the local paper next day under the headline *Chief Scientist Ian Chubb laments lack of science and maths studies*. As a reminder, see:

<http://www.canberratimes.com.au/act-news/chief-scientist-ian-chubb-laments-lack-of-science-and-maths-studies-20131118-2xrl.html>

The conference papers covered a wide range and fascinating variety of subjects. These started on Monday morning with a brief history of Princes and Station Piers in Port Melbourne and an account of the partial repair and restoration of Princes Pier, and finished with an account of Steam Roller manufacture in Victoria from 1890 to 1940, on Wednesday afternoon. Unfortunately I missed the Tuesday afternoon papers. While in Canberra I had to make time to fit in a personal appointment at the War Memorial to deliver some family (WW2) papers for the collections and discuss some possible stories about engineer units for the centenary of WW1. I hope to print a Conference Program in the next edition, containing the titles and authors of all the papers, and I will include summaries of a number of the papers in next year's editions.

**EHA Board Meeting (20<sup>th</sup> & 21<sup>st</sup> November):** The Board meeting started on Wednesday afternoon at 3.30pm, almost immediately after the close of the Conference. This first part of the meeting was a Strategic Planning session, with a facilitator, that lasted six intense hours, and sorted out a lot of stuff about who we are, what we need to do, and how are we going to get it done. The official board meeting, all day Thursday, covered a lot of ground. The New EA Regulations, coming into force on January 1<sup>st</sup> 2014, require the reduction of the EHA Board to 12 people only, that is, one from each of the 9 Divisions plus the Chair, Deputy Chair and Immediate Past Chair. For 2014, two people drop out, being Miles Pierce and Bill Jordan, and as Editor, I turn into a pumpkin (become an observer only). Everybody is there in the photo below except Mark Bush from WA, who was attending an EA Congress meeting, and Rod Caldwell, Newcastle Rep., who couldn't get away from Newcastle.



Other Board changes for 2014 are: Keith Baker, Chair (formerly Deputy Chair); John Heathers, Immediate Past Chair; Ben Johnston, Deputy Chair (formerly YEA Rep.); and Owen Peake, Victorian Rep. (formerly Immediate Past Chair). I hope you can work all that out! The photo might help.

Photo of the 2013 EHA National Board, taken on the steps of the Brasseley Hotel where we had the EHA Board Meeting. Left to right: Ben Johnston (Tas), Bruce Cole (Tas), Trevor Horman (NT), Miles Pierce (Vic), Owen Peake (Vic), Keith Baker (Can), Margret Doring (Ed), Neil Hogg (Syd), John Heathers (Syd), Richard Venus (SA), Brian McGrath (QLD), Bill Jordan (N'cle), Lyndon Tilbrook (Can). Absent: Mark Bush (WA), Rod Caldwell (N'cle).

Lastly, many thanks to Bill Jordan and his predecessors for their tireless work in editing and producing the EHA Newsletter for so many years.

