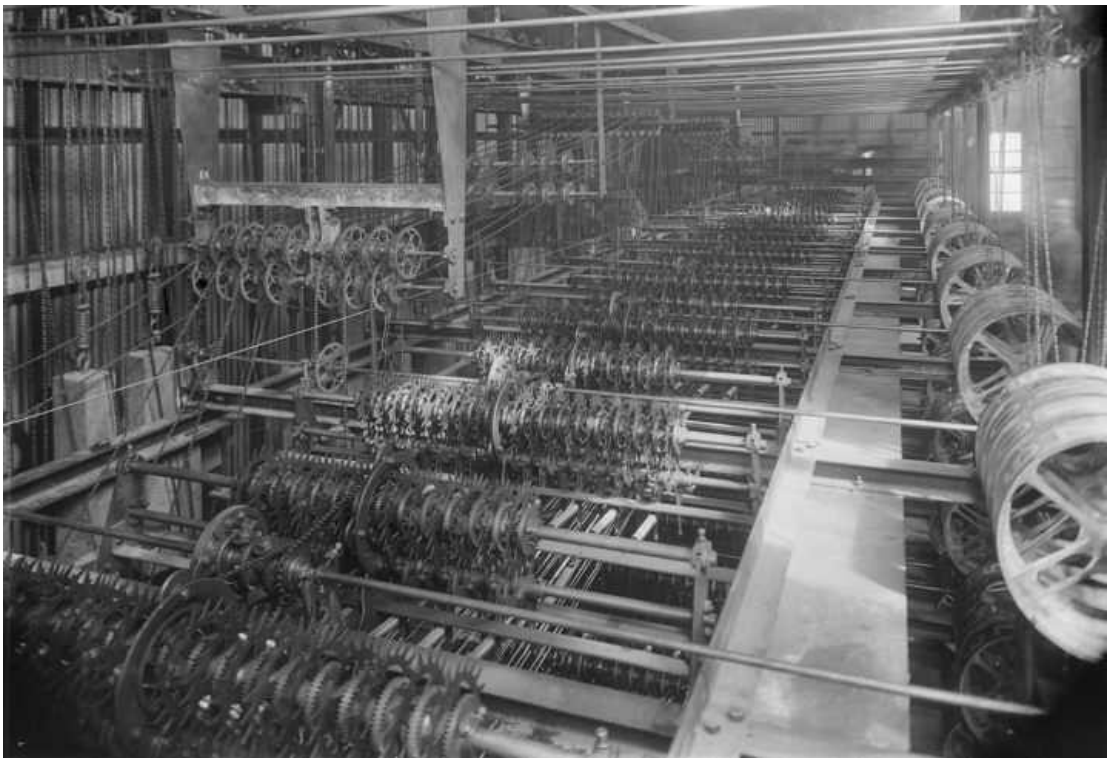
ENGINEERS AUSTRALIA ENGINEERING

HERITAGE AUSTRALIA

CEREMONY REPORT

THE JULIUS TOTALISATOR

The World's First Operational Computer



Heritage Recognition Ceremony

Eagle Farm Racecourse, Brisbane, Queensland

26 October 2015

Caption for title page:

An early Julius Totalisator.

The image shows the Top Plane of the machine. Note that all the components of the machine in this view are mechanical.

Image: Powerhouse Museum

THE JULIUS TOTALISATOR

The World's First Operational Computer

On 26th October, 2015, at Eagle Farm Racecourse, Brisbane, Queensland, His Excellency the Honourable Paul de Jersey AC, Administrator of the Government of the Commonwealth of Australia, attended a ceremony at which His Excellency addressed guests and unveiled an Engineering Heritage International Marker awarded to the Julius Totalisator, the earliest known on-line real time data and computation system. It is understood that this is the first time the Head of the Commonwealth of Australia has officiated at an Engineering Heritage Award Ceremony.

Sir George Julius invented the World's first automatic totalisator in Australia, installed the original purely mechanical machine at Ellerslie (Auckland) New Zealand in 1913, the second at Gloucester Park, Perth, Western Australia in 1915, and the third at Eagle Farm, Brisbane, Queensland in 1917. It was subsequently installed in 23 countries around the world.

The Award, Queensland's first International Award, was made in Brisbane as the 1948 electro-mechanical Julius Tote in Brisbane Racing Club's Museum is the only one left in place in Australia.

Sir George Julius was an outstanding Australian Engineer. He was Foundation Member of the Institution of Engineers Australia, and its President in 1929; Founder of the Council of Scientific and Industrial Research (CSIRO) and winner of many engineering awards and honours.

The Sir George Julius Medal was initiated by Engineers Australia shortly after his death in 1946 and is still awarded today.

The Award Ceremony was attending by relatives of Sir Julius, viz. a granddaughter, two great grandsons and several great great grandchildren.

Addresses at the ceremony were given by:

His Excellency, the Honourable Paul de Jersey AC, outlining the achievement.
Tony Shellshear, great grandson, on Sir Julius's life.
Neville Bell, Chairman of Brisbane Racing Club; on the importance of the totalisator to the Racing Industry.
An address by Brian Conlon, Totalisator Expert, describing the invention was read by Ceremony's Chairman, Andrew Barnes, Chairman of Queensland Engineering Heritage Committee.

Address by Tony Shellshear

SIR GEORGE JULIUS

Your Excellency the Administrator, and Mrs de Jersey, members of the Institute of Engineers and the Heritage Committee, members of the Australian Racing Fraternity, ladies and gentlemen.

If I were to ask an average group of Australians what an Irish engineering genius with a wicked sense of humour, an Anglican Primate with a strong stance against gambling, and the inventor of the automatic totalisator, had in common, their response might possibly be 'not very much?'. To which my response would be 'Want a Bet?'

George Alfred Julius was born at Norwich, England on 26th April,1873, to Churchill and Frances Julius. .The Anglican Primate I referred to was his father Churchill, an Archbishop of New South Wales, before taking on the role of Primate of New Zealand. Many may be familiar with just one of his contributions to the church in Christchurch Cathedral, sadly lost in the more recent earthquakes in that city. He was also very active in promoting women's rights, and in his stance against the dubious practices and corruption in the gambling industry.

The Irish engineer with the wicked sense of humour was George Julius's father-in-law, C.Y O'Connor, the Chief Engineer in Western Australia at the time, who is remembered for the famous water pipeline to Kalgoorlie, and for Freemantle Harbour, which caters for the world's large ships even today, virtually unchanged in over 100 years.

Early years

George was educated at Melbourne Church of England Grammar School and then at Canterbury College in Christchurch, New Zealand, where he completed a Bachelor of Science (Mechanical Engineering) in 1896. Later, in 1919, has was awarded a Bachelor of Engineering from the University of Sydney; engineering was no longer a science?

Between 1896 and 1907 he worked for Western Australian railways, during which time he published three important works on the physical characteristics and economic uses of Australian hardwoods. These are still considered valuable references today.

In 1907, George moved to Sydney as consulting engineer to Allen Taylor & Co. Ltd, timber merchants, at the same time establishing his private practice, later to become Julius, Poole and Gibson. His farewell card from WA Railways indicates clearly the high regard in which he was held.

Sir George grew to acquire a reputation for his technical genius; some referred to it as 'engineering wizardry'. Over the ensuing years, Julius Poole and Gibson, and specifically Sir George, were retained by Commonwealth and State Governments as advisers in many national engineering projects.

In 1913 he was elected president of the Engineering Association of New South Wales. He was a foundation member of the Institution of Engineers, Australia and its President in 1925.He was also a member of Council of the Electrical Associations of New South Wales, and its President in 1917-1918.

As one of the founders of the Council for Scientific and Industrial Research, (now CSIRO) he was appointed the first Chairman in 1926, retaining the position until 1945.Also in 1926, having fostered the formation of the Australian Commonwealth Engineering Standards Association, (now the Standards Association of Australia), he became President until 1939. Between 1940 and 1945 he was Chairman of the Australian Council of Aeronautics, having been instrumental in establishing an Aeronautical Research Laboratory

Other of his numerous roles over the years included Chairman National Research Council, Chairman of the Army Inventions Directorate, and President of the Rotary Club of Sydney.

Awards and Achievements

It probably comes as no surprise then that George was created a Knight Bachelor in 1929, becoming 'Sir George'.

In 1927 he was awarded the Peter Nicol Russell Memorial Medal of The Institution of Engineers, Australia; in 1938 the William Carlos Kernot Memorial Medal by the University of Melbourne, and in 1940, an Honorary Degree as Doctor of Science of Canterbury University College, Christchurch, New Zealand.

In his honour, the Sir George Julius Medal was initiated by Engineers Australia shortly after his death, and is still awarded today.

The Man

Sir George passed away in Sydney, Australia, on 30th June, 1946.

On his passing, many tributes were written and published in a myriad of newspapers and magazines, although nothing, thankfully appeared on Facebook… These, along with his eulogy, provide a small window into the character of a man of strength and of genius. In closing, I can do no better than to quote from these sources -

'With his rather gaunt face, his crop of curly brown hair, and his very luminous blue eyes', Julius was slight in build. He was always mentally alert and spoke in a staccato manner. He could be autocratic, impatient, even choleric, but those qualities were disciplined by his sense of fair play, his quick sense of humour, his objectivity in scientific judgement and his keen political sense'.

'His faults were the faults of greatness, the kind that those who knew him well smiled over and rather liked him for. His conviction. of the soundness of his views made him a difficult opponent to deal with in debate. His hatred of all the meanness of the spirit made him intolerant of pettiness, small-mindedness and mental weakness. He could not dissemble when disgust at evidences of such attributes swayed hire.' (He spoke his mind)

'He had the gift also of understanding the other man's point of view, and this enabled him to become a convincing exponent of the practical value of scientific research when governments had to be persuaded to make adequate funds available, and other interests had to be won over to co-operative effort.'

To me, one of his finest legacies to us as a family, was his documentation of the Julius Family History compiled during his brief period in retirement.

'Sir George Julius will ever be remembered as a notable engineer and scientist, a successful leader and administrator, a truly great Australian citizen, and a generous-hearted and lovable man.'

Thankyou.

Speaker CV: Tony Shellshear

Tony Shellshear, a great-grandson of Sir George, is a Brisbane-based geologist and computer scientist. For the last 35 years Tony has run a consulting practice providing services to the mining and exploration sectors of the resources industry in geological data management and analysis, and resource and reserve estimation and reporting.

His other interests include virtually anything mechanical, and he has spent the last few years restoring Sir George's original engineering lathe and his extensive collection of workshop and woodworking tools, as well as assembling and documenting Sir George's personal and professional items, of which he has become custodian. Tony is also an active member of the Anglican Church, to which he has contributed in a variety of capacities over the years; Tony is the first to admit that in trying to understand the logic and operation of Sir George's mechanical totalisator, he needs all the help he can get.

Address by Brian Conlon

I too recognise His Excellency the Administrator and Mrs De Jersey, Ladies and Gentlemen,

The world's first automatic Totalisator was invented by George Julius here in Australia in 1913 and was installed at Ellerslie Racecourse in Auckland New Zealand where it commenced operation. The second installation was at Gloucester Park in Perth in 1916 and the third installation was here at Eagle Farm in 1917 and the one here in the museum was installed circa 1948.

That first system at Ellerslie, which was purely mechanical, was described as a giant tangle of piano wires, pulleys and cast iron boxes and although many racing officials predicted that it would not work; it was a great success.

George founded the Australian company Automatic Totalisators Limited in 1917 to further develop and export these systems. Three examples of major developments were in 1917 the Julius Tote went from being purely mechanical to electromechanical, in 1927 Automatic Totalisators developed the world's first Odds Computer and in the 60s, the world's first electronic computer based totalizator. The company started out dominating the industry globally and later became part of an oligopoly.

One snapshot of Julius Tote installations only, lists a full A4 page of installations in Australia, two and a half A4 pages in New Zealand and many more pages of installations overseas. A 1970 company article indicates ATL had installations in 29 different countries.

Automatic Totalisators had subsidiary companies overseas, I will mention only one Atusa renamed Autotote, which was a major manufacturing subsidiary in the USA, with a history equal to that of the parent company that it outlived.

In the home region, Automatic Totalisators had branches in the North and South Islands of New Zealand and in every state of Australia with a head office and factory in Sydney.

Just to glance at one of the many installations, the Julius Tote in Longchamps Paris in 1928 was one of the biggest ones with 273 terminals. This system took the title The Largest Totalisator In The World, from the Julius Tote in Bombay India and later lost it to the Julius tote in White City London. This French contract was Australia's largest financial transaction with France at the time.

It is interesting to compare the Julius tote with its successor, electronic digital computers. The simplest block diagram you can draw of a digital computer consisting of four boxes can equally be applied to the Julius tote; however below that level the architectures are radically different.

I have some video clips produced by the Greater London Industrial Archaeology Society on my Totalisator History website, relating to the Harringay Julius Tote. I don't think there would be anyone today seeing the clip showing the Julius Ticket Issuing Machine in operation that would not say this is part of a computer system.

Dr. Doron Swade MBE, in his New Scientist article about the Julius tote, wrote that it is the earliest on line real time data processing and computation system that the Curators of the London Science Museum have identified.

Many of the metrics are the same. Regarding metrics, a system was built and tested in Sydney in 1920 capable of supporting 1000 terminals and a sell rate of 250,000 transactions per minute; This is good by today's standards.

An Automatic Totalisators France Limited Prospectus written in 1927 refers to computing and indicating of totals. If this is the first use of the word computing to refer to a machine, as previously people performed computing, then by deduction the Julius tote is the first machine to be called a computer.

I end this talk with a comment from Emeritus Professor Trevor Cole from Sydney University who said of George Julius "We should be aware of our engineering heroes". Hopefully this award will raise the awareness of George Julius an Australian engineering hero and this Australian achievement.
Thank you.

Speaker CV: Brian Conlon

Brian was the Chief Engineer of Automatic Totalisators Limited Queensland and worked on the digital computer based totalisator systems that replaced the Julius Totes in Brisbane and Ipswich in 1979. He worked here at Eagle farm and several other racetracks in the region for over 33 years working through 5 takeovers and 3 different computer based totalisator systems. His last position was Queensland Operations Manager for Tabcorp.

Photographs from the Ceremony

The Governor and the Shellshear Family, 26 October 2015

The Official Party, 26 October 2015

The Shellshear Family and Paul Coghlan, 26 October 2015

Paul Coghlan with interpretation panel and Engineering Heritage International Marker, 26 October 2015

Engineering Heritage Queensland members with the interpretation panel, 26 October 2015

The Totalisator, 26 October 2015

CHANGE CONTROL
VERSION 1 15 JULY 2016