

VicRoads Association Newsletter No 195



Membership of the Association is available to all who have been members of VicRoads or forerunner organisations or the spouse of deceased members and bestows on them all the rights of the Rules of Association. Current cost of membership is a once only fee of \$30 plus a joining fee of \$5. Enquiries about membership or receipt of the Newsletter by e-mail should be directed to the Secretary at 60 Denmark Street Kew 3101 or by phone or e-mail as shown in the footer below. An application for membership of the Association can be found at the end of the Newsletter.

Dear Members,

The main purpose of this newsletter is to alert you to our functions in March and April. They are listed in the Dates for Your Diary section below. I especially want to remind you of the Annual General meeting scheduled for Monday 20th March at 11.30 am followed by the buffet lunch at 12 noon.

I also want to alert you to a change in our program for the year. We have changed the dates for the visits to the Western Distributor Authority and the Melbourne Level Crossing Removal Authority. In fact we have reversed them – and they are now correctly shown in the program below. Please change your diaries accordingly and note the details later on in the newsletter.

This newsletter concentrates mainly on two topics – old cars (or more specifically, old Lancias) and a potted history of health and ill health in Melbourne as seen from the perspective of a car drive. You will see what I mean when you read on.

Please be aware that I will be overseas in India from 19 February to 15 March painting some masterpieces in the Great Indian Desert in Rajasthan. I will be home in time for the AGM. So if you have any queries during that time, please contact our secretary Jim Webber using the details at the footer of this page

Enjoy the read.

David Jellie - Editor



Dates for your diary

Our program this year is as follows:

DATE	TIME	EVENT	
March	Thursday 2	6.00 pm	Drinks and dinner at Waverley RSL
	Monday 20	11.00 am	AGM in the Theatrette followed by buffet lunch in the Cafeteria at 12.00 noon (meet at Reception by 11.25 am)
	Monday 27	TBA	Visit to the Melbourne Level Crossing Removal Authority
April	Monday 10	12 noon	Occasional lunch, Shoppingtown Hotel
May	Monday 1	TBA	Visit to Western Distributor Authority
June	Monday 5	12 noon	Occasional lunch, Shoppingtown Hotel
	Monday 19	TBA	Visit to Infrastructure Victoria
July	Monday 31	TBA	Visit to Melbourne Metro Rail Authority
August	Monday 14	12 noon	Occasional lunch, Shoppingtown Hotel
September	13 and 14	TBA	Visit to VicRoads Regional Office in Traralgon and local attractions
October	Monday 9	12 noon	Occasional lunch, Shoppingtown Hotel
	Thursday 12	6.00 pm	Drinks and dinner at Waverley RSL
	Monday 30	TBA	Visit to VicRoads South Eastern Projects
November	Monday 27	12 noon	Occasional lunch, Shoppingtown Hotel
December	Monday 4	12 noon	Christmas lunch at Kew HO
2018			
February	Monday 12	12 noon	Occasional lunch, Shoppingtown Hotel

What's coming up

Drinks and Dinner at Waverley RSL – Thursday 2nd March

This is an opportunity for old friends and colleagues and their partners to get together in very pleasant circumstances to enjoy dinner together- at a very reasonable price. It is a good opportunity to get your old work groups together for a bit of fun. If you can make it, please contact Ken Vickery on 0409 561 618 or kenvickery@tpg.com.au so that we can arrange the catering. We always have a good attendance at these - so if you haven't been before come and join us. It is a great night.

Annual General Meeting – Monday 20th March at 11.30 am

The AGM will be held in the Cafeteria at Head Office between 11.30 a.m. and 12 noon on 20th March. It will be followed by a buffet lunch in the Cafeteria on the first floor. **Please note that the starting time is 11.30 am and not 11.00 am as shown in the last newsletter.**

At the AGM the General Committee for the next twelve months will be elected – six office bearers; President, Vice President, Hon. Secretary, Hon. Asst Secretary, Hon. Treasurer and Hon. Asst Treasurer, and six ordinary members, half of the latter to be elected for a two-year period. Nominations are to be submitted in writing by the proposer, include the consent of the nominee, and lodged with the Secretary by Tuesday 14th March. A nomination form is attached.

The business of the meeting will be to confirm the minutes of the 2016 Annual General Meeting, receive the Annual Report, receive the Financial Statement, consider any Notice of Motion, elect Committee members, appoint an Auditor, confirm or amend the joining fee and annual subscription, and any general business. Any Notice of Motion proposed is to be received in writing by the Hon. Secretary no later than Tuesday 14th March. A form for this purpose is attached.

We are always keen to find new committee members so if you are interested – or know of someone else who may be interested – please don't hesitate to fill out a nomination form.

Please also note that the address of the Hon. Secretary is c/- Ms Natalia Morgan, 2nd Floor, VicRoads, 60 Denmark Street, Kew 3101.

Visit to the Melbourne Level Crossing Removal Authority – Monday 27th March at 10.00 am

We had a very interesting visit to the Authority in May last year and this one will follow up on the progress of work and any new issues.

We propose to meet in the foyer of the Authority at 121 Exhibition St at 10 am. Please contact Jim Webber before 20th March if you propose to come – so that he can arrange security passes to enter the office. Subject to work commitments on the day, the CEO Kevin Devlin will be involved in the presentation. Friends and partners are welcome to come along. Following the visit, we will have lunch at the pub over the road.

Occasional Lunch – Shoppingtown Hotel – Monday 10th April 2017

Bookings are not essential, but it would help with arrangements if you can let Kelvin York know on 9438 1028 if you can attend. We hope to see you there.

News from VicRoads



John Merrit, CEO of VicRoads, sent the following note to staff early in January.

'Firstly, congratulations to the team who delivered the English Street Bridge erection over the weekend in the face of a whole host of challenges. The team did a great job and achieved some really good outcomes in minimising disruptions for drivers. Well done to everyone involved.

On Sunday, I joined Damien Afxentis and members of his project team, with the acting Premier and acting Minister to announce the contract award for the Swan Street Bridge widening. This is an exciting, high-profile project given its location across the Yarra and in the heart of Melbourne. The construction will serve up some significant challenges for us. It's a four-lane bridge that we are expanding to five, but for 13 weeks we'll be down to three lanes, and this will cause substantial disruption to around 30,000 of our customers each day. The team will be working hard on taking everything we've learnt from the recent closures, and applying it to this different challenge. I invite anyone from across VicRoads who has any innovative ideas about how we can alleviate this problem for road users, to put your ideas forward to Damien Afxentis Metropolitan Projects – Western.

It was a thrill this week to welcome our 20 new graduates for 2017 to VicRoads. I've had a couple of opportunities to meet and talk to them, as has the Executive Leadership Team. This year's graduates come from a variety of disciplines including Accounting, Commerce, Information Management and Technology, Media and Communications, Urban and Regional Planning, and Civil, Environmental, Electrical and Electronic Engineering. For the first time in 20 years, the number of women recruited to the Graduate Development Program has outnumbered men. Given that we only choose the best candidates, hopefully it shows that we are becoming a more attractive employer for women. With women only making up 37% of our staff, and it being heavily biased in R&L, this is another small step in our future direction. The diversity of this intake is not limited to gender, and includes a number of our graduates coming from culturally and linguistically diverse backgrounds. Overall, the group speaks a combined 25 languages! They'll be spread throughout the business, including rotations in the regions, and I know we will all give them the warmest possible welcome, and all the support we can.

Also in the diversity space, I was thrilled to hear that the first roles that are part of the Recruit Smarter pilot program have been advertised this week. Our involvement in this initiative, headed by the Department of Premier and Cabinet (DPC), really plays to the heart of our intention to find better ways to actively support diversity and inclusion by avoiding bias and recruiting based on merit. From the 2016 People Matter survey results I know many of you are passionate about this. In recruiting for these VRO3 Project Engineer/Officer and VRO4 Senior Project Engineer/Officer roles in Major Projects and Regional Services we're potentially recruiting future leaders so it's vital we get this right. The official launch of this initiative by DPC is scheduled for 15 February 2017, and while more detail will follow about the pilot, I'm proud we're leading the way.





I've also been involved this week in a number of budget briefings and I want to thank the people who work tirelessly at this time of year to pull together our budget submissions. It's an extraordinary amount of work and I know a lot of pressure is put on teams to complete business cases and sometimes produce last minute pieces of work. This budget is one of the most important we've ever dealt with, particularly in the maintenance space, and we really want to do the best job we can. So, thanks to everyone who is working so hard.

This afternoon we are participating in a workshop which is part of the review we've commissioned into our international projects division. Many of you would have heard me say that I believe strong organisations are often very generous organisations. They look outside their walls to see how they can help the broader cause and you can see some of that work playing out in our social housing and family violence initiatives. It's very important to us that the long history we have with sharing skills, particularly in road safety, into other countries continues, but that it's done with the best outcome and benefit to everybody. We've commissioned a review of how we might do that and Executive Leadership Team had a workshop on this today.'

On 3 February, John further reported to staff on current issues as follows:

'On Tuesday, Dave Shelton, Jude Pettitt and I visited the Dandenong Customer Service Centre (CSC) where we were hosted by Office Manager, Jo Collard and Area Manager, Sonja Binks. The purpose of our visit was to focus on two important issues that have been elevated to the Executive Leadership Team.

The first is the significant number of international licences that are being presented at the point of a drive test where our staff have reason to believe the licence is not genuine. The result of this is that the customer cannot undergo their drive test, causing a great deal of frustration and delay. This also impacts significantly on our CSC performance, particularly in Dandenong where there is a high proportion of drive tests that involve international drivers. Dave, Jude and I had a chance to have a look at a number of these licences and have the issues explained. What's important is that everyone is aware that we only issue a license when the drive test is passed. There is no suggestion that we are not meeting our commitment to the community in ensuring people on our roads can drive, but this is providing a very poor service outcome to these customers and creating a real problem. We were there to investigate this and see what we can do.

The second issue we looked at is when international drivers present for their drive test when they have not had lessons, they are not accompanied by an instructor and they need an interpreter. We have a high fail rate in these circumstances and we are concerned about the OH&S risk to our drive instructors. On Tuesday, Kelly Doyle from Dandenong, was good enough to let me sit in on a drive test. In this case it was a Chinese woman in her 50s, without an instructor and needing an interpreter. This was her sixth attempt at getting her license... she passed! Dave and Jude also went out on tests, but with less success. This was also an opportunity to see just how challenging it is to do a drive test around busy industrial areas where the traffic is very heavy, and I know this is a situation many of our staff experience every day. We were also reminded that it's been eight years since our drive test has been reviewed.

The day was rewarding and a great opportunity to reflect on the diversity of our customers and communities, and the opportunities and challenges this brings. I would like to think that we as an organisation can continue to come up with creative solutions to solve these challenges, including harnessing the knowledge and experience of our own Culturally and Linguistically and Diverse (CaLD) staff.

On Thursday we had our quarterly People and Culture Governance Committee, with a great range of VicRoads leaders participating and chaired by Anita Curnow. As an extension of our usual focus on health and safety at this meeting we focused more on mental health, and in particular, our stress claims. Our claim numbers are low, but of course issues of emotional wellbeing are present in every team throughout the organisation. I expect our managers to be looking for these issues, not waiting for them to emerge, and when dealing with these to access advice from their People Services representative and to make use of our EAP Manager Assist Line via our Employee Assistance Program. We also looked at reports on sick leave numbers and reports on our Lifestyle Inventory results from the 49 leaders who have just been assessed in a 360 degree review process. These results are really terrific and show enormous improvement in people's experience of those leaders.

This week marks a substantial milestone in the 2017-18 budget bidding process with all VicRoads budget bids submitted to the Department of Treasury and Finance (DTF). This has been a mammoth effort over the last 12 months and I thank all those who have drafted this year's business cases across Major Projects, Regional Services, Registration and Licensing, Access and Operations and Investment and Design Services. I would particularly like to acknowledge the work of Pipelines and Programs who co-ordinate, collate, draft, provide valuable advice and liaise with the Department of Economic Development, Jobs, Transport and Resources (DEDJTR), Department of Treasury and Finance (DTF) and Department of Premier and Cabinet (DPC) on our behalf. December and January is a busy time for them particularly the Program Co-ordination team and I acknowledge and thank them.'

News from our members

Iris Whittaker and her Lambda Man

Most of you will remember Iris as the librarian at VicRoads. After her retirement in 2008, she returned to work at VicRoads as an agency employee, carrying out a variety of roles across a broad range of departments. She is still working at VicRoads – currently working as an Executive Assistant to an Executive Director. She recently gave me a copy of the program of the 2016 Vintage Sports Car Club (VSCC) Two Wheel Brake Rally because she thought I would be interested in its historical context. It was prepared by a VSCC member, Dr Peter Donald, and provides an amazing history of health and ill-health in Melbourne. I thought it was so interesting that I contacted Peter who gave me permission to reproduce the program. You can read it later in this newsletter under Trivia and Didactic Whimsies.

Iris' husband is Russell Meehan. Russell is a retired solicitor but he has held a lifelong passion for cars. I don't think it would be correct to call him a petrol head in that his love of cars does not cover all makes and types. His love centres mainly on vintage cars and especially Lancias. However his private car is a 1998 Subaru Liberty. In fact at the time of writing he owns two of them although one of them is up for sale.

He currently owns three Lancias – 1927 and 1928 Lambdas and a 1969 Fulvia. Russell can't remember exactly when he started to take an interest in cars but a photograph of him appeared in *The Argus* when he was about twelve, showing him peering under the bonnet of a car at the Motor Show in the Exhibition Building. He said that the photographer spent a bit of time searching for some grease to smear on his face. He can remember starting to drive before he was nine. It was in a 1927 Buick belonging to his father. At first he changed gears while his father was driving and then he and his next older brother drove it up and down the driveway at home. The driveway was very long so they had good practice at changing gears and reversing. He also went driving with his two eldest brothers (7 and 8 years older) in various Ford V8s.

When he was 16 years old, a friend's father bought a Lancia Lambda with a Rugby motor. One of his brothers drove it to dances and parties and it was then that the love affair with Lancias started. However his first car was a Ford Custom Twin Spinner which he bought when he was eighteen – after he had gained his licence. Soon after, he bought a 1925 14/40 Vauxhall, his first vintage car. He paid about £120 for it.

In 1965 he bought his first Lancia, a 1927 7th series Lambda – also for £120. He still owns it. He drove it for five years but he decided it needed complete restoration so he stripped it down in his garage and is gradually restoring it, replacing rusted and worn parts, so that it will be as good as new when it is finished. Russell estimates that it would take six months to complete if he worked on it full time – but of course he is taking his time.



Vauxhall 14/40

During 1972 he and seven other Lancia enthusiasts purchased a Lancia Pentaiota chassis. This vehicle was about 25 feet long and was intended to be bodied as a bus or charabanc. This one may have been used by the Victorian Railways to transport holiday makers from Porepunkah to Mt Buffalo, but it had no body. A cabin from a former Lancia Kappa tow truck was donated and a tray was constructed to which several rows of seats were attached. Although very slow it was a great hit with children at the Castlemaine Lancia Rally. It was sold to a Queensland enthusiast in 1990.

Also in 1972 he bought a 1956 6th series B20 Aurelia coupe. This model was the pinnacle of the traditional Lancia design having the first production 60 degree V6 engine and being the last model to have a sliding pillar front suspension. However after five years it was apparent that it needed serious restoration so it was sold and the new owner carried out the restoration.

In 1986, Russell bought a red 1969 Lancia Fulvia coupe from Western Australia – sight unseen. He had it brought over to Melbourne by train. However it turned out to be a water-logged disaster with a sump full of water and serious rust in the bodywork. He rolled his sleeves up, fixed the motor, got the bodywork repaired and restored it to full working order and has driven nearly 100,000 miles in it without serious trouble. He takes this car to Queensland annually for the WinterSun Rally as well as using it frequently in Victorian events.



Russell's Aprilia and Fulvia



Lancia B20 Aurelia



Iris, Russell, and the Lambda



The Lambda at Russell's niece's wedding

He also imported a 1939 Lancia Aprilia from England in 1981. It needed a lot of mechanical restoration and he sold it after two years to concentrate on his other restoration work.

After his retirement in 1994, Russell bought another Lambda. Remember the first one is still in the garage in bits. This one is an 8th Series Weymann bodied Saloon built in 1928. It was in good working order and he has been driving it ever since – as far afield as Sydney. A previous owner had driven it to Arnhem Land twice. In May 1996 he shipped it to England where he did over 4,000 miles in it – in England, France and Italy. On this trip he attended a Lancia rally at Fobello in Italy (near Turin), the birthplace of Vincenzo Lancia, the founder of the Lancia company. The Lambda is an innovative car produced from 1922 through to 1931. It was the first car to feature a load bearing unitary body without a stressed roof, that is, it doesn't have a chassis. It also pioneered the use of the sliding pillar independent front suspension, incorporating a coil spring and a hydraulic shock absorber. It had excellent four-wheel brakes which were still a bit novel at that time. In all, 11,200 Lambdas were produced of which about 350 are still owned around the world.

The rally held in Fobello, Italy every five years is for Lancia Lambda owners, and in 1996 11 Lambdas from Australia went across out of a total of 45 cars. Russell has attended this rally seven times as well as rallies in England, France and Switzerland.

The Lancia Motor Company is now owned by FIAT. Nonetheless, the local community of Fobello is very supportive and welcoming to the Lancia cars which descend there every five years. Russell said this reflects the very high esteem held for the memory of Vincenzo Lancia and the contribution he made to their community.

Russell is the Treasurer of the Australian Lancia Register which he was instrumental in forming in 1971 with some fellow Lancia owners. There are now 250 members and the Register is part of a world-wide network of Lancia motor clubs. Every two years the Register organizes a major rally in Castlemaine attended by about 250 people in 100 Lancias, usually including about 20 Lambdas and about 20 members from overseas. He also organizes one day events, two day rallies and alpine trials. This involves choosing the route, organizing accommodation and meals and preparing instructions for participants.

Russell is also a member of the Victorian Sports Car Club (VSCC). His Fulvia and Lambda saloon are listed in the Club permit scheme managed by VicRoads. This is highly valued by vintage car owners allowing them to make limited use of historic vehicles on the road network. He uses his Lambda in club events and for special occasions such as weddings for friends and relatives only. The small vases in the cabin are usually filled with white roses.

Robin Underwood and 63 Years of Involvement in Traffic Engineering

Robin has recently reflected on his involvement in traffic engineering and related activities that span the 63 years period 1953 to the present time, and has summarised his relevant technical writings over this time in *The Writings of a Road Engineer*. It runs to 48 pages. He provided me with the following synopsis...

'I commenced work in traffic engineering in September 1953 in the Country Roads Board as an Engineering Assistant under H P George, Traffic and Location Engineer. At that time, traffic engineering in Australia was in its infancy, and HP George was the ONLY engineer in Australia whose title contained the words traffic engineer.

I was very fortunate to work under H P George in those early years. He was widely experienced and highly respected. He encouraged staff to read, to take part in professional society activities, and to undertake research into various aspects of traffic engineering, including road traffic behaviour. Acting on his advice, I undertook the two-year part-time course for the Diploma of Town and Regional Planning at The University of Melbourne in 1954 and 1955.

Incidentally, the word traffic first appeared in an engineering title in Australia in 1947 when the CRB appointed H P George as Traffic and Location Engineer. He relinquished the position in 1949 when he moved to the Town and Country Planning Board. The position then lapsed until he returned to the CRB in early 1953 and was reappointed to it.

The next two traffic engineering appointments in Australia were made in 1954 when the Department of Main Roads, NSW, appointed R E Johnstone as Traffic Services Engineer and the Melbourne City Council appointed J M Bayley as Traffic Engineer.

While some aspects of traffic engineering (such as, for example, manual traffic counting, road signing, traffic line marking and traffic signals) had been used in Australia for many years, it was not until the second half of the 1950s and into the early 1960s that the terms traffic engineer and traffic engineering began to receive widespread use throughout the nation.

In 1955, the then Conference of State Roads Australia (now Austroads) established a Traffic Engineering Standing Committee. This Committee played a significant role in the development and implementation of traffic engineering practices in Australia. By the late 1950s/early 1960s, traffic engineering was widely recognised as a separate branch of engineering throughout Australia.

Over the past 63 years I have been involved, to varying degrees, in traffic engineering and related matters, firstly during my time at the Country Roads Board /Road Construction Authority, then at Caulfield Institute of Technology /Monash University, and more recently both in my occasional writings and in submissions and comments to relevant bodies.

Recently, I have collected together 118 of my technical writings, spanning the period 1956 to 2016. The first of these was a paper on Functions of the Traffic Engineer in Highway Planning read to the Civil Engineering Branch, Melbourne Division, Institution of Engineers, Australia in 1956. The second, written in 1957, was titled Tentative Warrants for the Installation of Pedestrian Crossings, and appeared as CRB Research Memorandum No.13. The most recent ones include A History of Traffic Engineering in Australia (1989 – 2015) (ARRB Research Report ARR 391, 2016), which is an update of A History of Traffic Engineering in Australia (ARRB Special Report No.42, 1989), and the Writings of a Road Engineer. Unpublished. (2016).

The Writings of a Road Engineer lists in chronological order the 118 writings, and classifies them as follows:

- 3 academic theses.
- 4 published books.
- 2 sets of course material.
- 24 papers in refereed journals.
- 11 papers in refereed conference proceedings.
- 4 papers in other international journals.
- 18 papers presented at other national or international conferences.
- 18 technical reports.
- 34 miscellaneous papers and articles.

It also includes a summary discussion of the writings and provides specific details of them grouped under the following themes, namely traffic engineering, road safety, road design, road planning and road engineering practice. In an endeavour to put the writings into context, a summary of my career and other relevant matters are also included.'

Any members interested in obtaining a copy of *The Writings of a Road Engineer* may contact Robin at runderwood@ozemail.com.au so that he can email a copy to them.

Trivia and didactic whimsies

The 2016 Two Wheel Brake Rally held on Sunday 11 December 2016

The Two Wheel Brake Rally is held by the Vintage Sports Car Club (VSCC) on the second Sunday in December every year - as it has been done for the last 40 years. It is conducted in Melbourne and is an inner city, traffic-light run aimed primarily at the older cars which only have brakes on their rear wheels. Last year, there was a car (a 1907 Cadillac) which only has one brake drum which operates via a live rear axle. Such things just boggle the minds of modern people who often cannot conceive of cars that require real skill to operate, let alone operate safely.

The VSCC aims to keep the profile of these cars in the minds of the public and that they are still useable in the modern world, despite what the motor manufacturers would have the authorities believe! A lot of people cannot comprehend that such vehicles can exist or that they can still be used and the only way that we can ensure their continued operation is by keeping up their profile.



A French cyclecar called a Bedelia. They were used as field ambulances during WW1 because they were driven from the rear seat and a stretcher could be put on the front. There is one in Victoria owned by a VSCC member. Dr Peter Donald (see below) owns a chain-driven cyclecar called a GN.

Health and Ill-health

This particular run was researched and designed by Dr Peter Donald – a medical doctor with an interest in the history of medicine and an enthusiast of vintage sports cars. I am indebted to Peter for this story which he has allowed me to reproduce in full. I was originally going to edit it by providing the history only, but then I thought that some of you might want to replicate the journey through Melbourne’s medical past. So I have left it largely unaltered. The directions are in the italicized text. Peter called the journey Health and Ill-health and it commenced in the Domain near Latrobe’s cottage.

Prior to European settlement of the Port Philip area, infectious diseases were not a significant problem because of the low population density and the length of time it took to reach the area which exceeded the incubation periods of most diseases. Every infectious disease that would afflict the European settlers was imported. Archaeological records suggest, however, that medically life for the local aboriginal population was far from ideal as they suffered badly from the painful consequences of many injuries which never had a chance to heal or to be treated.

In the nineteenth century the new settlers introduced diarrhoeal diseases, measles, smallpox, tuberculosis, influenza, typhoid and venereal diseases and these had a devastating effect on the indigenous population. By the late nineteenth century, un-sewered Melbourne had earned the nickname “Smellbourne” and it had one of the highest infant mortality rates in the world. Something had to be done.

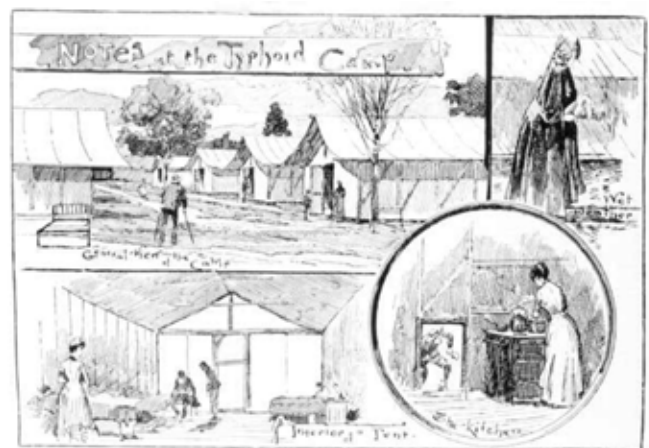
MELWAY MAP 2L,A2. Turn left out of Dallas Brooks Drive into Domain Road and head east along Domain Road to Punt Road (Map 2L, F3) where you turn right to head south along Punt Road to Commercial Road, and then turn right (Map 2L, E9) and head west along Commercial Road passing the Alfred Hospital on your left.

The Alfred Hospital was named after HRH Prince Alfred, Duke of Edinburgh who was shot in an (unsuccessful) assassination attempt in Sydney during the royal visit in 1868. The hospital opened in 1871 and is situated on the corner of Commercial and Punt Roads, Prahran. It is Melbourne’s oldest hospital but one and it is the oldest hospital on its original site.

Here also is the Baker IDI Heart and Diabetes Institute which, dating from 1926, is one of the oldest medical research institutes in Australia. Also housed in this precinct is The Burnet Institute which is named after Sir Frank Macfarlane Burnet (born in Traralgon in 1899) who was director of the Walter and Eliza Hall Institute in Parkville from 1944 to 1965; he effectively catapulted “WEHI” and the Melbourne medical research milieu to international prominence when in 1960 he was awarded the Nobel Prize for his work in immunology and virology: a bright chap indeed! The impact this Nobel Prize had on medical research in this city cannot be overestimated; it set in train a series of advances which has taken Melbourne from being a relative colonial backwater to becoming one of the world’s leading medical research centres.

Turn Right into St. Kilda Road and follow your radiator cap to Princes Bridge where you turn right into Flinders Street.

As you pass the Victorian College of the Arts on your left, give a thought to Prince Henry’s Hospital which was at 236 St. Kilda Road until 1994 when it was closed and demolished while responsibility for its patients and medical records were taken over by the behemoth that is Monash Medical Centre. Prince Henry’s origins lay in the Collins Street Homeopathic Dispensary of 1869. It opened as a hospital for the sick and the poor in 1876 and it moved to St Kilda Road in 1885. In 1934 it was renamed Prince Henry’s Hospital in honour of the royal visit of the Duke of Gloucester to open the Shrine of Remembrance. A major rebuilding was undertaken just before WWII and it became a major teaching and research hospital until the aforementioned closure.



“Notes at the Typhoid Camp at the Alfred Hospital”, 1889.



The "Hoddle Grid" applies to the street layout of Melbourne's Central Business District. It is named after Robert Hoddle who laid it out in 1837. So as better to align with the Yarra it was not laid out exactly North/South, East/West, but for the purposes of these instructions we shall approximate these axes. All major streets are one and a half chains wide, there being 66 feet - the length of a cricket pitch - in one chain, and the blocks are ten chains square. There being eighty chains in one mile and the grid being eight blocks along its (almost East-West) long axis, this makes the distance from Spencer Street to Spring Street exactly one mile.

Where Federation Square is now situated there once stood The Melbourne City Morgue. This morgue was completed in 1871 and abandoned in 1883 when the site was taken over by the railways for Princes Bridge station.

After leaving the corner of Flinders Street and Swanston Street in 1883, the morgue was somewhat of a vagrant for a number of years until it settled in 1888 a stone's throw away on the banks of the Yarra at Batman Avenue. With the opening of the new Princes Bridge in that same year (1888) the morgue was still virtually at Melbourne's front door and in an era before refrigeration!

With the arrival of the telephone this morgue had the ironic telephone number of "Central 13". In the 1950s the morgue moved again, this time to Flinders Street extension (on the left beyond the viaduct) and in 1988 it found its current location in Kavanagh Street, Southbank.

Turn right into Flinders Street (Map 1B, N 10) head East for 30 chains then turn left into Spring Street, hug the left lane for 5 chains and then turn left again into Flinders Lane (Map 1B, V 9) and head West along Flinders Lane.



Godfrey Howitt

Just after you enter Flinders Lane on your right is Howitt Lane. Here was the residence of Godfrey Howitt (1800-1873) who was arguably the first physician in Melbourne as well as being a botanist and entomologist of some note.

Then just after Howitt Lane, on your left is Milton House at 25 Flinders Lane. Built of red brick in the Art Nouveau style in 1901 it was originally a private hospital the façade of which was designed by Smith and Ogg. For some time a free X-ray service was provided here by the Federal Government as part of its TB eradication program.

Turn right from Flinders Lane into Russell Street (Map 1B, Q 8) and head North along Russell Street.



The Melbourne City Morgue when it was situated at what is now the location of Federation Square

Almost four chains after you turn right into Russell Street you will pass Beany Lane on your right (1B, R8; just beside the Louis Vuitton shop and opposite the old T & G building on the corner of Collins Street). James George Beaney (1828-1891) was a flamboyant, controversial senior surgeon at the Melbourne Hospital and his surgery was here. He was known as "Diamond Jim" because of the rings he wore even during operations and also as "Champagne Jimmy" because of the champagne he dispensed freely (as shown by the discarded bottle at the base of the figurine which itself is now in the care of the Medical History Museum at Melbourne University). He was also a Member of the Victorian Legislative Council. His estate left generous endowments to various charities including scholarships at the University of Melbourne (which are still much sought after) and for the establishment of "The Beaney Institute for the Education of the Working Man" in Canterbury.



Diamond Jim Beaney

Beaney was in his lifetime controversial, to say the least. He was tried twice for the murder of Mary Lewis, a St. Kilda barmaid, following her death after what, one can only presume with the benefit of hindsight, was an "illegal" abortion.

Just before you pass over Bourke Street you will pass the Russell Street Public Lavatory in the centre of the road. Built in 1902 it is Australia's oldest known surviving public toilet and it was the first public toilet in Victoria for women, having been opened in the very year when women gained the right to vote and to sit in the Federal Parliament, as well as "to spend a penny" here. This loo was made possible by the installation of a system of sewers in Melbourne which finally came towards the end of the nineteenth century and saw the end of nightcarts in the central city, not to mention sewage and effluent in the streets themselves. Although it has been filled with sand and closed off, both the men's and the women's toilets are still there and intact as far as is known. The sculpture now on top of it is titled, "A History Apparatus – Vessel, Craft and Beacon" and it shows the continuity of technical endeavour from the past, into the present and beyond to the future.

Continue along Russell Street only as far as Lonsdale Street (1B, Q3) and turn left into Lonsdale Street and head West.

In Lonsdale Street on the right (on the north side) between Russell Street and Swanston Street was the Melbourne Hospital, which became the Royal Melbourne Hospital. Later The Queen Victoria (Memorial) Hospital was here.

On the corner of Swanston Street and Lonsdale Street the then Melbourne Hospital opened in 1848 with ten beds in a two-storey cottage. At its opening it had two inpatients and four outpatients.



"The Melbourne Hospital"

The hospital grew to occupy the whole of the Lonsdale Street block. It received a Royal Charter in 1935, making it "The Royal Melbourne Hospital". At the end of WWII the Royal Melbourne Hospital moved to its current site opposite Melbourne University when the Americans vacated that building, having used it during the hostilities. The vacated Lonsdale Street site was occupied by the Queen Victoria Hospital (which was established in 1896) when it moved from its previous site in William Street. The Queen Victoria Memorial Hospital moved to Clayton in 1989 where it is now part of the Monash Medical Centre.



The Queen Victoria Hospital

Continue to head West along Lonsdale Street and turn right into William Street (1A, F3 some 40 chains from where you turned in from Russell St) and then after five chains turn right again into Little Lonsdale Street and head East along Little Lonsdale Street to 372-378 Little Lonsdale Street, about five chains from William Street.

In 1916 it was claimed in the press by a "specialist" that up to ten per cent of Melbourne's children were "syphalised". In any event concerned citizens were disappointed that, despite the controlling of diseases such as typhoid with the construction of Melbourne's sewerage system from late Victorian times, venereal diseases were still rampant well into the twentieth century a fact not helped by ex-servicemen returning from the battle fields of World War I and various other places along the way.

In this pre-penicillin era there was already a Men's Venereal Disease Clinic in Lonsdale Street and, somewhat belatedly, for the sum of 6,700 pounds the Health Department constructed the Women's Venereal Disease Clinic here at 372-378 Little Lonsdale Street in 1919. Attempts to open a clinic in other "nicer" areas had met with fierce opposition from local residents and at that time this position in Little Lonsdale Street had the advantage of catchment area in that it conveniently serviced the "black slum" brothel district of "Little Lon". The building is a modest but solidly built structure of red brick in a vaguely Georgian Revival style.

In 2012 there was a heritage dispute when Victoria University wanted to demolish this building and the adjacent former tuberculosis clinic to erect a 32-storey "vertical campus". The building is more socially significant than architecturally significant and heritage considerations have won so it has now been incorporated into the plan for the "vertical campus", prompting one feminist wag to comment in the Hawthorn Album that it is like a 32 storey phallus rising out of the former Women's Venereal Disease Clinic!

Continue heading east along Little Lonsdale Street to Spring Street, turn Right into Spring Street (1B, 6N) head South for five chains, then turn Left into Lonsdale Street.

Facing south at this "top" end of Lonsdale Street is the Royal Australasian College of Surgeons which is responsible for the training, education and regulation of surgeons. A school was built here in 1854 and known as The Model and Training School which became the co-educational Melbourne Continuation School. By the 1920s the original school structure was becoming quite unsound and in 1927 the boys moved out to their new school in South Yarra (Melbourne High School) and a few years later the girls moved out to eventually settle at MacRobertson Girls' High School.



The Continuation School

The school was demolished in 1934 and the Royal Australasian College of Surgeons building was constructed in a then "modern" Greek Revival style.

Turn left from Lonsdale Street into Nicholson Street (2F, J1) and then after five chains turn left into Victoria Parade (Map 2B, J12) and head West.

A little to the east from the corner of Nicholson Street and Victoria Parade is the Royal Victorian Eye and Ear Hospital which traces its origins back to 1863 as The Eye and Ear Infirmary when it opened with one bed and a lot of outpatient work with the many injuries from the industrial areas of the inner Melbourne suburbs. It was here that Professor Graeme Clark worked out the "bionic ear" after pondering the mechanism of the ear canal while sitting on an Aussie beach looking at the spiral of a sea shell. He performed the world's first cochlear implant here in 1978 and the rest is history.

Dominating the corner of Nicholson Street and Victoria Parade is St. Vincent's Hospital. In 1889 five Sisters of Charity arrived in Melbourne with the dream of establishing a hospital. Their small 30-bed cottage hospital opened here in 1893 and now it has grown to be a major teaching and research institution. Pioneering microsurgery work was done here. Squizzy Taylor died here in 1927 having been wounded in a shootout with a rival gangster (who also died as a result of the shootout!).

Drive West along Victoria Pde/Street and turn right into Rathdowne Street (Map 2B, G12) and head North along Rathdowne Street.

As you pass the Royal Exhibition Building on your right, spare a thought for the 4,046 people who were "hospitalised" here over the six months of 1919 when 500 beds were set up in the Royal Exhibition Building to cope with the overflow of patients from Melbourne's hospitals during the influenza pandemic just after World War I (of those 4,046 patients here, 392 died plus another 2,000 Melbournians in other hospitals and at home).

At 125 – 139 Rathdowne Street (opposite the Melbourne Museum) is a red brick building which was built in 1907 as the nurses' home of the Children's Hospital (later, The Royal Children's Hospital) before becoming St. Nicholas' Hospital and it has now become a residential complex. The Children's Hospital was here from 1876 and it had previously been the residence of Sir Redmond Barry, his mansion being subsequently demolished in 1912 to make way for new hospital buildings.

Continue heading North along Rathdowne Street and turn left into Faraday Street (Map 2B, H7) and head West to Swanston Street (Map 2B, E7).

With hope there will be ample parking around this area as it is a good opportunity to avail yourselves of the cafes and bakeries to refresh yourselves or an opportunity to fettle your vehicles. There is a wonderful subterranean loo under Faraday Street just east of Lygon Street (2B, G7), which is a legacy of the arrival of the sewerage system a little over one hundred years ago and the health benefits which came from that were immense. The back lanes, which once were frequented by the nightmen crashing and banging dunny cans, are still there and in some of the bluestone cobbled lanes one can still see the wear marks from the iron tyres of the horse-drawn night carts all those years ago.

At the western end of Faraday Street near Swanston Street (2B, E7) is the 1876-built former Faraday Street School. It was for some years incorporated into the Royal Women's Hospital, although it is now used as a community centre.

The Royal Women's Hospital traces its origins back to 1856 when the "Melbourne Lying-In Hospital and Infirmary for Diseases of Women and Children" was established in a rented house in Albert Street, East Melbourne as a public hospital for the poor. A few years later the hospital

moved to this site which was then referred to as Madeline Street, North Melbourne and is now referred to as Swanston Street, Carlton. It received Royal Charter in 1954, becoming "The Royal Women's Hospital" and after 150 years here the hospital moved in 2008 to the corner of Flemington Road and Grattan Street.

For many years it was found that premature babies had a very high incidence of subsequent visual impairment from a permanent condition called retrolental fibroplasia (that is what affected Stevie Wonder's vision). This puzzled the world of neonatal paediatrics for a long time and it was Dr Kate Campbell (later Dame Kate Campbell) who in 1951 proved the link between the high oxygen levels in the premature babies' humidicribs and the development of retrolental fibroplasia and subsequent visual impairment. This was a ground-breaking breakthrough at the time, it affected clinical practice all over the world and it happened here at The Royal Women's Hospital in Melbourne.

Opposite the western end of Faraday Street is the precinct of the original Medical Faculty of the University of Melbourne for over a hundred years from its establishment in 1862 until it moved to new buildings on the other side of the university in 1968. It was the first English speaking medical school in the southern hemisphere and the first colonial medical school to have its degrees recognised by the General Medical Council.

The red brick building opposite is the early twentieth century Anatomy Building and it is a far cry from the first anatomy dissection of 1863 being performed in a tin shed behind the Carlton home of the first Professor of Anatomy. For the rest of the university there were advantages in having the Anatomy School here in the pre-refrigeration era as it was on the far side of the university lake (which was not drained until the mid-twentieth century, late enough for students still to be throwing "Commos" in during the 1930s) so "the intellectuals" (as the rest of the university was referred to in Victorian times) did not have to cope with the smells from the Anatomy School across the lake.



Looking across the lake to the medical school at Melbourne University during the 19th century.



Research in far-flung antipodean colonies was, if anything, unique. Regularly during the 1930s bodies were seen falling from the roof the red brick Anatomy School as Professor Wood-Jones assessed the trauma resulting from falls from various heights on various "body types" by throwing cadavers off the roof of the Anatomy School. His resultant work was the definitive reference for many decades in forensic analysis of bodies which had been subject to trauma. Also during this period much development of the Pathology Museum occurred. Specimens from post mortems at the Royal Melbourne Hospital in Lonsdale Street were brought up here on the tram; it was nothing to be sitting on a Swanston Street tram in the 1930s with someone wearing a white coat who had a formalin filled glass jar containing someone's insides destined for the Melbourne University Pathology Museum.

Turn left into Swanston Street (2B, E7) and head South for one block to turn Right into Grattan Street (2B, E8) and head West along Grattan Street to Royal Parade where you should turn right (2B, B8) and head North along Royal Parade in the left hand lane.

You are now in one of the modern world's larger centres of medical research. Around you are the Medical Faculty of the University of Melbourne, The Walter and Eliza Hall Institute of Medical Research (that is where as director Frank MacFarlane Burnet did the research which led to the Nobel Prize referred to earlier), the Howard Florey Institute (the Adelaide-born researcher who was awarded the Nobel Prize in 1945 for his ground breaking research into penicillin-based antibiotics in the 1930s and eventually became Lord Florey), the Peter MacCallum Cancer Centre (Sir Peter MacCallum was the grocer's son who as the much-loved Professor of Pathology convinced the Victorian Government to establish a special cancer clinic almost seventy years ago), The Peter Doherty Institute for Infection and Immunity (Laureate Professor Peter Doherty started out as a veterinarian and eventually was awarded the Nobel Prize for medical research in 1996 - and Australian of the Year in 1997 - and one often sees him walking around this area in his 70s still doing active research), The Royal Dental Hospital, The Royal Women's Hospital and the list just keeps going on and on!

There is an option here depending on how much driving you want to do: If you are in an easier-to-drive car and running early you can detour via Gatehouse Street (beware of the reprobates who meet monthly behind 110A Gatehouse Street) over to Melway Map 2A, G10 where on the hill once stood the Melbourne Benevolent Asylum. This is only recommended if you feel like some extra inner-Melbourne driving because the Melbourne Benevolent Asylum has long since gone without trace and you will be coming back here anyway.

The Melbourne Benevolent Asylum once stood high on the hill bounded by Abbotsford Street, Elm Street and Curzon Street, North Melbourne. Perched up there from 1850 until 1911 it served as a foreboding warning to new arrivals during the gold rush as it was often one of the first things they saw from their ships as they sailed into Melbourne for the first time: if they didn't "make it" in this harsh new land they could well end in a sad state in an establishment like this. In 1911 The Melbourne Benevolent Asylum moved from this prominent position to Cheltenham where it is now the Kingston (Geriatric) Centre and there is an Edwardian housing development on the former Benevolent Asylum site (note how similar the houses are).

The Port of Melbourne was an arrival point for infectious diseases from abroad and those early arrivals also passed Coode Island which was used as a quarantine station and after 1915 as a sanatorium for victims of bubonic plague (and from that period to this day the 1908 Quarantine Act can still be dusted off if necessary).



Back to heading North along the left carriageway of Royal Parade.

At Melway Map 29, G12 turn left into Walker Street (remember you may enter the Royal Parade bicycle lane (or any bicycle lane) for a distance of 50 metres (two and a half chains) for the purpose of slowing down to turn "if it is safe to do so without interfering with cyclists" - this is a good thing to remember when slowing down for a turn in an old car with a non-synchromesh gearbox. It helps preserve the rear dumb-irons from the effects of the car behind and it allows one to be slow enough to avoid any unseen pedestrians around the corner, especially if one has two wheel brakes). Head West along Walker Street and veer to the right at the second roundabout following the sign pointing towards CSL and head over the speed humps on Poplar Road (the Zoological Gardens should be on your left), over the railway level crossing (beware of the unprotected tram crossing just after the railway crossing) and go down to C.S.L. and the former Mount Royal Hospital (29, D10).

Now part of The Royal Melbourne Hospital, on your right is the former Mount Royal Hospital which has such an interesting and chequered history that regularly "Historical Lantern Tours" are operated by an historian suitably attired in Victorian costume (enquire by e-mail to: jeff.whittington@mh.org.au).



Jeff Whittington conducting one of his tours



The buildings extant date back as far as 1875 when they were used as an industrial boarding school for neglected or orphaned girls and there have been reports of sightings of "ghosts", especially of distressed girls in the Victorian buildings around the old school quadrangle. The site has also been used as a facility for the destitute in earlier times and for aged and geriatric care in more recent times.

On your left (opposite the now Royal Melbourne Hospital – Royal Park Campus) is CSL. The Commonwealth Serum Laboratories was established one hundred years ago in 1916 when Australia found itself cut off by war from its usual supplies of medicines. This site was established a couple of years later in 1918 and the red brick buildings of this period are still extant and one of them now houses a museum. After producing smallpox vaccine CSL's first big test came with the influenza pandemic in 1919. Since then CSL's track record has been nothing less than world standard in the fields of vaccines, anti-venoms, blood products and research. In 1923 CSL was one of the first four laboratories in the world to produce insulin for diabetics and in the 1940s, following on from Howard Florey's work in Oxford, CSL was the first laboratory in the world to produce penicillin for civilians (as opposed to the armed forces). Since privatisation of CSL in 1991 it has continued to be a world leader in its field.

Continue down Poplar Road and turn left into Oak Street (Map 29, B10), head south for about 40 yards and then turn right into Garrard Street and then left into Cade Way and drive carefully and slowly around Cade Way as this is now a residential precinct with children playing.

The Royal Park Psychiatric Hospital operated here for over 90 years. It was the first psychiatric hospital established in Victoria after parliament's passing of the Lunacy Act of 1903 (as opposed to parliamentary acts of lunacy since then!). The initial buildings were constructed between 1906 and 1913 by the Public Works Department in the Queen Anne Style. Royal Park Hospital itself was decommissioned in the 1990s in line with the policy of de-institutionalisation of psychiatric care. The buildings are now largely private residential and when I was checking out a course some weeks ago, one of the owners took me and showed me an Edwardian cast iron wall ventilator in his place and inside the ventilator (but irretrievable without demolishing the thing) lies a set of dentures which once would have belonged to one of Royal Park's inmates; how the dentures got there is anyone's guess but they are there as a testimony to the interesting history of these buildings.

By the end of World War II there was still no effective pharmacological treatment for any psychiatric conditions. This changed after a Melbourne doctor, having returned from internment in the notorious Changi prison camp, discovered in 1948 the world's first effective medication for a psychiatric illness being lithium for manic-depressive mood disorder. Thus was ushered in the modern era of psychiatry and it happened in Melbourne. (Previously the only effective medical treatments had been electro-convulsive therapy and lobotomy). There is a plaque commemorating this individual in a little garden in front of the Queen Anne style buildings as he became superintendent here in 1952.

When you return to Garrard Street (where you came in) turn left and return to Oak Street (Map 29, C10) turning right into Oak Street... but beware of the old cars which will be turning into Garrard Street... especially the two wheel brake old cars. Continue South along Oak Street and wind your way via Mannigham and Church Streets (and under the railway line) to Flemington Road where you should turn left (Map 2A, E1) at the traffic lights (but beware, as I was nearly cleaned-up by a car which had come off the freeway and went straight through a red light here when I had the green arrow, double check!). About 150 yards later turn left into Elliott Avenue (Map 2A, E2) and head for the FINISH at Yarra Bend Park (Map 2D, F7) via Princes Street, Alexandra Parade, Queens Parade, Heidleberg Road and turn right into Yarra Bend Road at Map30, G12.

Fairfield Infectious Diseases Hospital was originally known as The Queen's Memorial Infectious Diseases Hospital and it opened here in 1904. Somewhat isolated from society in the pre-antibiotic era, it provided isolation and expert care for children and adults suffering from typhoid, cholera, smallpox, diphtheria, poliomyelitis, scarlet fever and other infectious diseases (the absence of these once common and dangerous infectious diseases makes one realize how things have improved for our generation!). Fairfield Hospital came into its own with the epidemics like influenza in 1919 and poliomyelitis in the 1930s, the late '40s and the early '50s. It also housed long term polio victims who relied on respirators (the "iron lungs"), some for many, many years. In its heyday it was renowned for its research but it was finally closed in 1996, its final years being taken up with the treatment and palliative care of terminal HIV/AIDS patients.

Continue heading south to the FINISH at Map 2D, F7.



Charabancs

In the story about Russell Meehan – the Lambda Man – I mentioned that he and others bought a Lancia charabanc chassis – so I thought it would be appropriate to finish with a few charabancs.



1920 "Sauer" Charabanc leaving for a picnic with the staff of 'Darge' photographers on board. Photo courtesy of State Library of Victoria.



Tourist Bureau Charabanc at Mount Lofty, South Australia. Photo courtesy of State Library of South Australia.

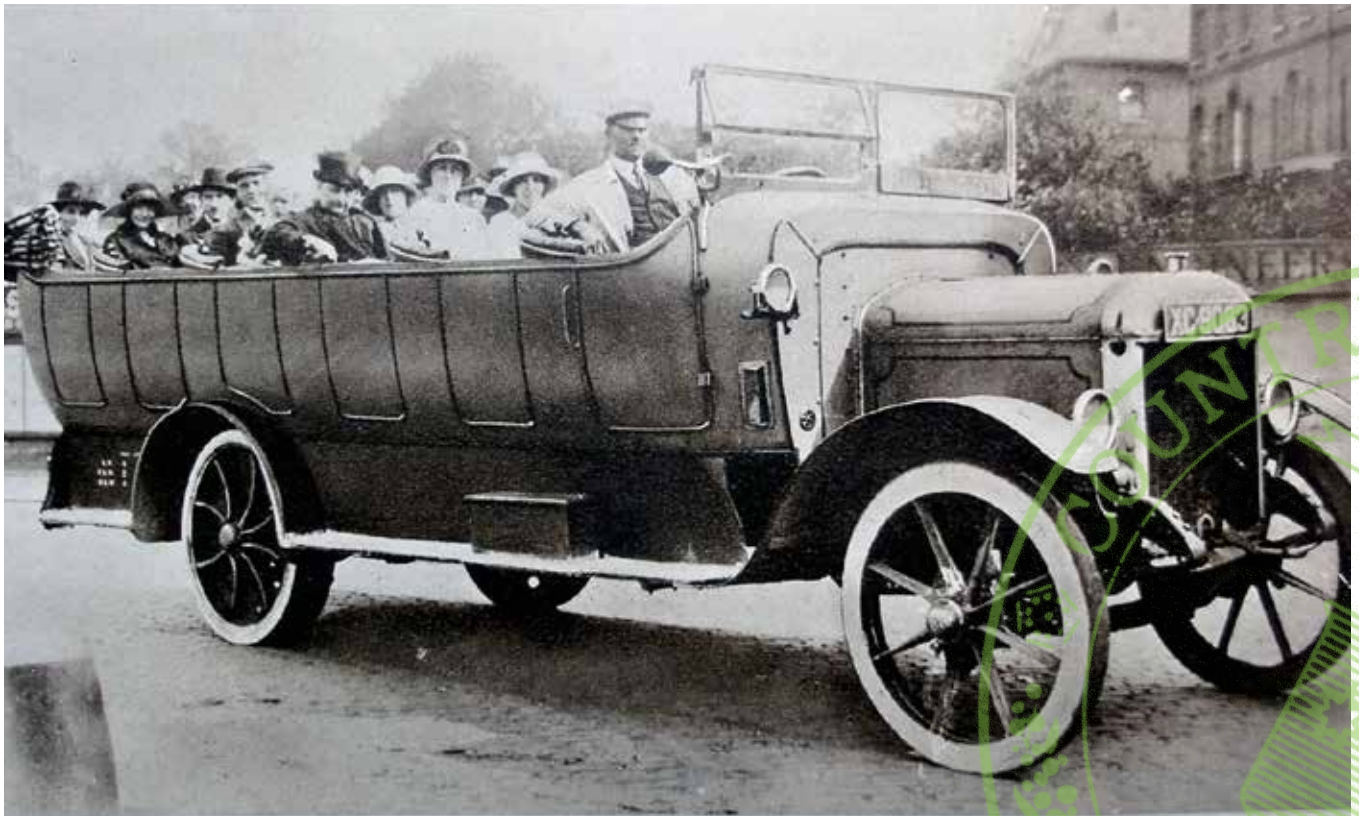


Photo courtesy of Wikipedia Circa – early 1920s



Photo courtesy of State Library of South Australia.

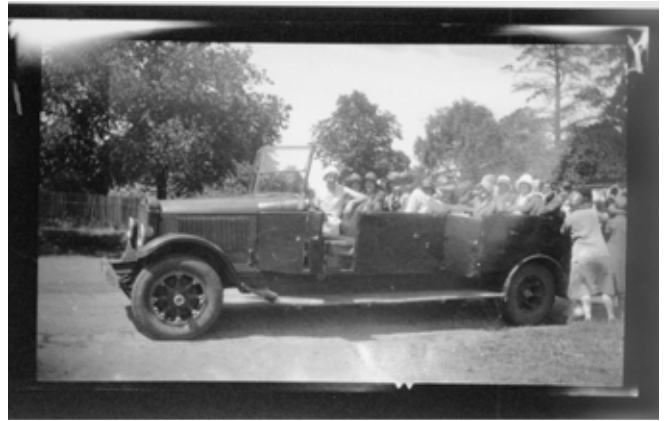


Photo courtesy of State Library of South Australia.



Photo courtesy of State Library of South Australia



Hydroelectricity

With the current debate raging about power generation, I thought it might be useful to make a small contribution to the debate. This is about hydroelectricity.

Hydroelectricity is an established power-generation technology with over 100 years of commercial operation. It is produced when moving water rotates a turbine shaft; this movement is converted to electricity with an electrical generator.

Hydroelectricity makes up about 17% of the total world electricity production. The top four largest electricity producing power stations in the world are all hydroelectric: the Three Gorges in China (18.5 GW), Itaipu in Brazil (14.8 GW), Guri in Venezuela (10.1 GW) and Tucuri in Brazil (8.4 GW).

A small number of countries, including Norway, Canada, Brazil, New Zealand, Paraguay, Venezuela and Switzerland, produce the majority of their electricity through hydropower.

Australia has more than 100 hydroelectric power stations, with the majority located in New South Wales and Tasmania. The annual production of hydroelectricity in Australia for 2012 was slightly over 6% of the total annual power generation, contributing only 0.4% of the world's total hydroelectricity production.

The largest hydropower station in Australia is the Snowy Mountains Hydroelectric Scheme with a capacity of 3.8 GW, representing almost half of the total hydropower capacity in Australia. It was originally designed as an irrigation scheme by diverting water from the Snowy River catchment into the Murray and Murrumbidgee Rivers. The water falls 800 metres (2,600 ft) and travels through large hydro-electric power stations which generate peak-load power for the Australian Capital Territory, New South Wales and Victoria.

There are three main categories of hydropower technologies: run of river, impoundment, and pumped storage. The run-of-river technology relies on the flow of the river at an elevated point, which, through gravity, is fed to a turbine generator. Impoundment hydropower systems employ one or more dams to store water. The potential energy stored in the dam is converted to electricity by passing the stored water from an elevated point through a turbine generator located at the lower point. Pumped hydropower is a two-dam system, where one dam is installed at a higher point to the other. During off-peak hours when the cost of electricity is low, the water from the lower reservoir is pumped up to the elevated reservoir using electricity from the grid. When the cost of electricity is high during peak hours, the water is released from the upper dam to generate electricity. Pumped hydropower is the only hydropower system that produces a non-renewable form of hydroelectricity.

Most of the installed hydropower stations around the world and in Australia are impoundment-based, utilising large reservoirs for storage of water. The electricity generated from these systems is renewable, but is not greenhouse gas neutral. The hydropower dams are a source of methane, which is 25 times more greenhouse potent than carbon dioxide (CO₂). Methane is formed in the dam when organic matter decays in the absence of oxygen. The organic matter is made up of both the plant material flooded when the dam is initially filled, and plant and soil debris washed into the dam from the banks and upstream. Phytoplankton is also a source of dam emissions in the form of organic matter.

Dams with large seasonal differences in height will produce methane emissions from a continual cycle of growth and decay on the banks when plants grow in summer, only to be flooded again in winter. The greenhouse gas emissions from hydropower stations are estimated on the basis of CO₂ equivalency (CO₂e) and they range widely from 5 to as high as 200g CO₂e/kWh, with median value of 40g CO₂e/kWh. For comparison, coal-fired power stations emit 1000g CO₂e/kWh, five times as much as the highest-emitting dams.

Organic matter decay in hydropower dams is a source of greenhouse emissions in the form of methane. Another disadvantage of the hydropower technology is the large areas of land needed to construct large hydropower dams. It is common for very large hydroelectric facilities to have dams measuring several thousand square kilometres. This poses many environmental and social challenges such as altered ecosystems, the loss of archaeologically and culturally significant sites, and displacement of whole communities. As an example, construction of the Three Gorges Dam in China required the relocation of over 1 million people. The large surface areas of hydro dams also increase water loss through evaporation. At an average, loss of water from hydroelectric dams is in the range of around 35kg/kWh. This is significant for a dry continent like Australia.

Despite these limitations, hydropower is the only mature renewable electricity generation technology that is flexible to provide both peak and base load electricity requirements at a cost comparable to coal-produced electricity. The future of hydroelectricity relies on careful planning to minimise negative impacts to communities, ecosystems and culturally significant sites.

The run-of-river technology is the most environmentally benign method of hydroelectricity production and a greater share of this technology should be given in future energy generation. The future of the pumped-storage hydropower stations relies on use of intermittent wind and solar energy sources, instead of grid electricity, to pump water between reservoirs.

Decreasing Australia's close-to-90% coal dependence for electricity generation should be the ultimate goal for future energy technology developments and hydropower still has a role to play.



The Machine Hall Floor of Murray 1 Power Station