GOLDSMITH

THE PYRENEES HERITAGE PRESERVATION MAGAZINE

LAKE GOLDSMITH THRESHING RALLY

WITH CHAFFCUTTING AND ASSOCIATED SKILLS AND EQUIPMENT

Rally No 114 NOVEMBER 2 & 3 2019 at 1234 LAKE GOLDSMITH-CARNGHAM ROAD

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Edition 152 June 2019 Find us at- www.lakegoldsmithsteamrally.org.au

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2ND & 3RD NOV, 2019

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- Steam & Oil Engines
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- Displays of Earthmoving, Cars, Motorcycles, Tractors & Trucks
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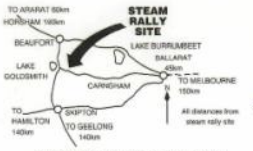

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ADMISSION PRICE: • Adults $15.00 • Children aged 5-16 $5.00 • Exhibitors and Children under 5 free

For rally information contact: Trevor Ph: 0407 539 041 or Graeme Ph: (03) 9723 3310 Mob: 0418 388 149

www.lakegoldsmithsteamrally.org.au • PO Box 21 Beaufort 3373

Our Mission Statement

To foster, nurture, encourage and demonstrate technical, agricultural and life skills associated with the Industrial Era.

To provide a quality environment where these skills may be used to educate and entertain members and visitors.

To run two weekend rallies each year, and be available at convenient time for other interested groups or individuals.

To conserve and develop a heritage collection.

Find us on the net at:- **www.lakegoldsmithsteamrally.org.au**

Contact us at:- **info@lakegoldsmithsteamrally.org.au** **or** **The Secretary P.O. Box 21 Beaufort 3373**

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CERVUS EQUIPMENT

Overview

Welcome to Goldsmith 152, June 2019

For this edition there are a few changes, yours truly has delved into a bit of DIY training to try and improve my M S Publisher abilities. There is a way to go yet, but hopefully the cover is a bit more interesting. The type font has also changed to Agency FB as a change from the Times New Roman Bold used previously to see if it is any easier to read in the A5 print format of the Post mail edition which comes ou for the April, June, October & December editions.

The February and August editions are email only.

Or Download from:- www.lakegoldsmithsteamrally.org.au/magazine.html

COVER PICTURES

TOP The Chaffey Brothers Psyche Bend steam irrigation Engine & Pump operated by the Sunrasia Steam Preservation Society at Mildura Victoria

BOTTOM Goldwind Stockyard Hill Wind Turbine Blade on show outside the Shire Office in Beaufort. Picture courtesy of Goldwind. Story in future edition.

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The Lake Goldsmith Steam Preservation Association Inc. 113th Rally

The highlight theme for this rally was single and twin cylinder tractors, steam petrol & diesel, all sizes. These tractors have been a common theme from the first steam powered vehicles through to modern times where they are still manufactured in large quantities as well proven reliable workhorses in rural, domestic and industrial applications.They appeared in all shapes and sizes from Australia and overseas. Below left this International Model C Mogul was built between 1910 to 1914 and used a single cylinder Famous engine with a bore of 8.75' & stroke of 15 " to produce 20?hp which it delivered via a single speed. Below right is its sibling Model D Titan 25hp.

Below centre This later Titan had moved to twin cylinders and it had gained Ackerman steering and a second speed in the gearbox.

On the left is a much later 7hp Club Cadet Mower from the 1970's.

The McDonald Imperial model EB tractor on the right was made in Richmond near Melbourne in 1913 by A.H. McDonald and Company. They used their own 25hp petrol/kerosene engine

Jebart of Ballarat made the tractor on the left using their unique stepped piston 2 stroke engine. You can read more on these tractors in Goldsmith No 126 P2 www.lakegoldsmithsteamrally.org.au/magazine.html

Lower Left. This Howard 2000 was one of a few Garden Tractors at the rally, some fitted with blades and attachments for gardens and lawns, There were quite a few specials using standard stationary engines fitted

to home made frames and transmissions. These are a great way to get around 40acres of rally grounds. McDonald and Lister Diesel



engines are used in the the models shown above. Below left is a Lister 3 wheeled diesel powered trolley that was popular at Markets and in warehouses. Below right is a BMB garden tractor made in the UK from the early 1930's by the British Motor Boat Manufacturing Co.




The tractor above is a German made Holder articulated 4 wheel drive single cylinder diesel light tractor from somewhere about 1960.

The American built Advance Rumely Oil-Pull tractor on the left is a twin cylinder petrol start kerosene tractor. They were made in various models from 1910 to the 1930's when they were purchased by Allis Chalmers during the depression . These reliable long life tractors used oil cooling and water injection to allow a high operating temperature.

Field Marshall and Fowler Marshall were popular UK manufactured tractors in their day. Their single 2 stroke cylinder providing reliable economical power. An unusual feature of these tractors is the flywheel which rotates in different directions on models which have a different number of shafts in the gearbox. One advantage of a two stroke engine.

Lanz Bulldogs arrived in force with a wide range of models and vintages from lamp to electric start. These tractors were made over a long period, and they were still in production for a while after John Deere acquired the company.

The K & L Bulldog (above right) was made under licence in Springvale, a Suburb of Melbourne by Kelly and Lewis who were manufactures of pumps and engines and other industrial and rural machinery. Tractors were hard to get in Australia after WW2. K & L made around 800 of these tractors. They also made a similar stationary engine which was used by the grain elevator board to fill silos in areas where there was not sufficient electricity supply.

This immaculate lamp start Bulldog and the working survivor Field Marshall and early lamp start Lanz show collector preference. Lanz was taken over by John Deere and the single cylinder Bulldogs where gradually phased out and replaced by the multi cylinder in line engined tractors which had been developed when John Deere replaced their historic line of twin horizontal cylindered tractors when they needed more power than it was possible to get from a cross chassis crankshaft design. Their horizontal cylinder tractors have now been consigned to history.

It is not to far back that these John Deere tractors were with us for their own rally It is good to see these popular tractors back at

Lake Goldsmith to join their siblings which are in various sheds around the site.

John Deere is really a success story with their long continuous history in agriculture and tractor production.

In addition to the internal combustion tractors the steam traction engines and rollers that are the backbone of our steam rallies also fit into the single and twin cylinder tractor category. The above picture was taken by Rochelle Kirkham from the Ballarat Courier who was at the Rally. If you Google :- Ballarat courier Rochelle Kirkham Lake Goldsmith Steam Rally you can catch up on her story.

The single cylinder Porsche Junior single cylinder tractor has an engine capacity under 1 litre that produces 14 or 15 hp at 2250rpm. They had a 6 speed transmission and were made between 1957 and 1963 in Germany.

Dr F Porsche designed his first tractor in 1934 and 4 prototypes were built. In 1937 design work for a " Volks Tractor " began as a government contract. In 1950 Allgaier began producing a light weight tractor using Porsche's 2 cylinder 18hp diesel engine. It was know as the Allgaier– Porsche System. A similar licencing arrangement was made with the Austrian Company Hotherr Schrantz.

In 1956 Allgaier sold its licence to Mannesmann AG who converted an old Zeppelin factory into a modern manufacturing and assembly plant to produce the tractor which was redesigned in 1959. This plant survived until 1963 when the last tractors were assembled, although a few were later assembled outside from parts. The plant was required to produce Tank engines for NATO.

This was the end of Porsche diesel tractor production.

About 125 000 Porsche tractors were produced in this factory in 1,2,3 and 4 cylinder versions. From the start all used a fluid coupling rather than a clutch. Renault took over the service facility for the existing tractors, many of which are still in regular service.

(Above left) Another single cylinder machine making its first appearance at Lake Goldsmith was this Garden Model outside shed No.1.

This Penta Cycle (left) is a reproduction of a Penny Farthing special with additional wheels to stabilise it and allow it to carry a large load of mail or other commodities .

It was made in Britain in the 1880's but it was not a commercial success due to its need for fairly flat road surfaces. There are no known original survivors, and not a lot of replicas.

Thanks to the Evans family for demonstrating this machine amongst there great collection of pedal power machinery, many of which have been described in earlier editions of Goldsmith.

They do not really comply with the cylinder rating, but they have a double throw crankshaft, so that's close enough

The "safety Bicycle " below left followed soon after the penny farthing. They were lower and less dangerous for the rider. The Victor (lower left) offered a sprung set front forks and sprung seats to offset the harsh ride from the solid rubber tyres. It had a rear brake, a novel feature in those days. The offset pedal leavers below moved the rider backwards, well behind the handlebars.

The special themes embedded into our rallies have provided a focus that brings a common interest display. Even on a grey day the quadrangle comes to life with visitors inspecting the ever changing variety of gear on display. It is amazing how much vintage machinery is around, and a grateful thankyou to everyone who contributed to the display and provided the treasured machines that are of so much interest to all.

The Jaques J15 back acting shovel is up I cylinder to 3 with its Lister JP3 engine as it scratches away to shift dirt from here to there while its sibling pushes its bucket along to scrape up a load for its long time working partner J series Bedford tipper.

Just over the hill the ACMOC shed is surrounded by Caterpillars of various models. The two draw bar pulled manual graders on show

look great and even when they are being towed around the oval theygive an idea of the early horse and tractor drawn machines and operators that made our early roads Outside the shed (below) there is action scratching around on the mound while the Jaques tries to

hide in a smoke screen in the background.

The Harry Ferguson Tractor Club of Australia operates the people movers from its home base shed. Members use their tractors to tow these all weather people carriers around the site.

It saves shanks pony a lot of work and lets more visitors get an overview of the exhibits on display at each rally.

They help visitors get an idea of what is where, which is difficult to do on a one day visit, and it is great to sit down for a while and take 5. Thank you all.

The International Harvester Club had this nicely restored 1962 model 80 Scout 4WD Ute on show. These were a popular machine in there day with around 2000 sold in Australia. The distributer is a basic 8 cylinder model with a 4 lobe cam and 4 plug lead holes moulded in. They are worth a look if you like the unusual. Some Farmall models added to the IH show. These machines have some dedicated followers that keeps these once popular tractors, many of which were made at Geelong in Victoria.

International Harvester made a lot of attachments themselves, and they provided a tractor that local manufacturers could use for special purpose applications.

Triumph Stag & TR6 made a nice line with the Sunbeam Alpine line-up in the Paddock below the Arena.

These popular British cars were once a common sight on our roads in the era before modified family cars became a popular way to achieve a reasonable performance at an economic price. These personalised transport machines became dominated by high priced , high performance super cars.

A TK Bedford truck, a Mark 2 and Mark3 Ford Zephyr and a Rover were all reminders of our rich history of British built cars. Having had 3 from each of Standard, Rootes, Ford, Bedford and 2 Land Rovers it was a nostalgic day down the back.

I will have to make a point of getting into the paddock more often.

This Holden FC look great and was a reminder of the days when these cars were on the road in their thousands, many with their 2 tone colour scheme. For others this c1938 Plymouth had been updated but still retained the body style of the original.

My first car was a 1937 Plymouth Sedan, so these cars bring back memories of simple reliable cars that travelled 100's of thousands of miles with their sturdy 6 cylinder side valve engines. The large bodies were comfortable and provided a lot of carrying space.

The exhibitors car park provided a lot of variety and cars came and went all through the weekend.

It was busy down the back and lots seemed to be changing. The living vans are memories of early road construction camps, and an era of draft animals.

The visitor display compounds put on a good show of large and small engines and a lot of other items of interest. It is amazing what can be seen here. For anyone who has not had a chance to visit them it is a spot to keep in mind at the next rally.

Another Great rally comes to an end and its time to pack up and go home. There were some grey skies, but the rain held off and the new week brought some welcome rain and a rainbow as well.

Now it is time to look forward to the Threshing Rally in November and the new gems of antiquity. Ed.

A thank you to those who helped with the removal and replacement of 1 Bedford and 1 Landrover before and after the Rally.

The 2 Chamberlain tractors and draw bar simplified the process from a moment of misery to a tidy outcome.

The Chamberlain tractor and travelling van above made a 3 day road trip from Clayton Bay in South Australia to visit the 113th Rally.A punctured front wheel needed help to take the wheel away to have a tyre fitted in the week after the rally. Thanks to the helper.

Left & above, The Phoenix shed displayed this Burroughs adding machine and a veteran Buick "Valve in Head" engine while the Vulcan Shed planed down a damaged Perkins 356 block.

Ready for the 114th Rally this Buncle & Sons single bag chaff cutter sits ready for the next sheaf of hay and an engine to drive it. The 3 pictures below were donated to the club some time ago. They are believed to have been taken in South Australia quite some time

ago and they cover 3 different scenes. Top left, he Portable boiler looks like a Marshall Britannia, and the thresher could be MARSHALL GAINSBOROUGH or certainly something similar. Top right, the thresher is CLAYTON & SHUTTLEWORTH. The portable is well hidden, but the square tank water tankwater cart looks great. Shafts for draft animals can be seen in some of these pictures.

Bottom right above, the boiler looks like a twin cylinder or compound locomotive type, and there is no makers name visible on the thresher.

Left and bottom centre above, and left and right are just enlargements to try and help identify what is what.

Can any one help with more information. There were a lot of helpers, pitch forks & Hessian bags were big sellers in those days.

For all that it was obviously a hard days work, there is a scene of community sharing that is difficult to replicate in our automated age.

If anyone has any similar threshing and chaff cutting action scenes I would appreciate the chance to include them. The upcoming rally is a chance to highlight this part of our past with

During a recent family reunion at Echuca by chance we stayed in a motel when a collection of Jaguars arrived from all states This was a great bonus for the trip, it is not often that great entertainment and a touch of history lands on the doorstep. Ed

GOLDSMITH
No 152 June 2019

HERITAGE FEATURE

THE CHAFFEY Bros. MILDURA & THE PSYCHE BEND PUMPS

Feature & background by Geoff Hamilton.

For visitor information :-

Contact:- email Geoff Hamilton at:- gjlaham@bigpond.com

Or:- Mildura Visitor Information Centre 61 3 5018 8380

This is a world class preservation that still pumps water into the irrigation system after 130 years

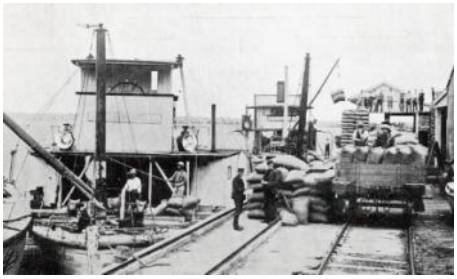
Sunrasia Steam Preservation Society

POWERED BY STEAM

THE IRRIGATION COLONIES ON THE MIGHTY MURRAY RIVER

From the mid 1850's paddle steamers opened the Murray, Darling and Murrumbidgee river system as a transport system that could get goods into inland South Australia, New South Wales and Victoria, and get wool and wheat out. The natural timber for fuel on the river banks, long navigable rivers and shallow draught of the paddle steamers powered by steam open the interior prior to railways.

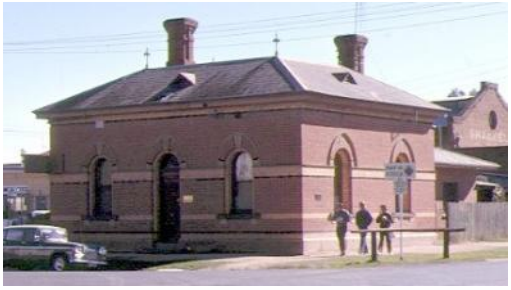
The Murray river does not have a reliable navigable connection with the sea which meant that the riverboats were pretty much restricted to the river which limited their use. To overcome this limitation Goolwa, a town on the Murray in South Australia was connected by Australia's first public railway, a horse drawn tramway to Port Elliot 11 KM away. Later, after 7 ship wrecks in Port Elliot, in 1864 it



reached the safer Victor Harbour with its long pier on which the historic tramway still operates. By 1884 Goolwa was connected to Adelaide by rail and the riverboats had a direct connection with a capitol city and the outside world for goods and passengers,

In 1864 Echuca, (right) an inland Victorian town, on the Murray River was connected to Melbourne by rail providing a second connection for the riverboats. Both Goolwa (above left) and Echuca became busy inland ports, and the inland boat system thrived with wood burning shallow draught steam paddle steamers.

Licences for the early stock runs (stations) South of the Murray River in Victoria, near what was to become Mildura started in the late 1840's. In areas near the border life was not easy for those early pastoralists on the land with hot dry winds, and low rainfall and infestations of the earlier introduced rabbits. By the mid 1880's, after a succession of owners, the original Yerri Yerri run had been renamed the Mildura Station, and it was owned by the Tapalin Pastoral Company which soon went into liquidation and the lease was up for sale.

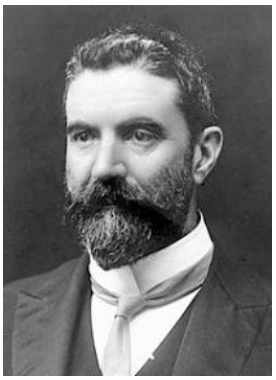


Prior to Federation of the Australian States to form the Commonwealth of Australia in 1901, each state charged custom fees for goods being transferred between the states. As Riverboat traffic increased the states built custom houses near their borders. South Australia built a customs house at Port Murtho (see far right picture from NGV 1884 picture from the Charles Bayliss Collection and enlargement above) and Victoria had one in the same year at Echuca (left). Victoria also set up a Customs House at Cowana (now Yelta) just West of Mildura in the 1860's, and later shifted it to Mildura (right) in 1891. Customs were not popular and there were endless conflicts and schemes to avoid the charges on various goods..

Meanwhile in California similar unproductive areas were being brought to life as productive farms by the use of irrigation. One family in particular which had a background in construction contracting, shipbuilding and inland waterway grain transport on the Great Lakes

The property was laid out as a well planned community with a rural area that was subdivided into 10 acre lots each of which was supplied with water to its highest point by a concrete pipe. Water was allocated according to the area. This project evolved as a prosperous settlement. With the completion of this project known as Etiwanda, they took up a 6000 acre project which would become Ontario, a modern 640 acre model town community with horse drawn trams, wide boulevards and an Agricultural college and facilities

George Chaffey had also founded the "Los Angeles Electric Company" making L.A the first US city to be exclusively lit by electricity. He was also instrumental in establishing trunk phone lines, and earlier in Canada he had been involved with a family bank, and had designed over 20 shallow draft steam ships for use on Lake Ontario



Back to Victoria, Alfred Deakin (right) , who later became Australia's second Prime Minister, was the State Minister for public works in the 1880s. As Chair of a Royal Commission on water supply which had been prompted by a severe drought in Victoria from 1877 to 1884, visited California to learn more of the irrigation settlements which had been implemented there. By this time Ontario in California had 3000 acres of irrigated land which was being worked by 85 families. Deakin contacted George Chaffey about the possibility of establishing a similar project in Victoria.

George and William Chaffey sent Stephen Cureton to Victoria to investigate the possibility of a Land Grant for property which they would develop as an irrigation colony.. Returning with a favourable report, George Chaffy arrived in Australia, and at Deakin's suggestion he inspected property along the Murray River, and eventually arrived at the Mildura Station. The property was about 100 Square Miles, only 15 of which had provided food fit for stock, the balance was Mallee scrub, small sections of which if flooded by the river could provide short duration food for stock. Droughts, overgrazing, excessive heat and the rabbit had all contributed to the deterioration of the property. Chaffey observed that the healthy Homestead Garden demonstrated the possibilities of irrigation, and the large water storage offered by Kings Billabong made an irrigation scheme a practical proposition.

The Victorian Government (Legislative Assembly) drew up " The Waterworks Construction Encouragement Act " in 1886 with leases of a block for each brother The Legislative Council insisted on a public tender, The Chaffey brothers saw this as a breach and took up a similar offer from the South Australian government to establish an irrigation colony on the Murray river on parts of two pastoral leases near what would become Renmark.

As the Victorian Tender did not draw any other interest the Chaffy Brothers ended up with Mildura as planned. The Chaffey's purchased the Pre emptive Right (freehold 320 acres) for the Mildura Homestead from its owners, and with Leases for Mildura Station in Victoria and Chowilla/Bookman runs in South Australia signed, both State Governments announced their agreements with the Chaffey Brothers in August 16 1887.

The approximate potential development areas (2 * 250 000 acres) of the leases have been overlaid on Google Earth. The South Australian block near Renmark is on the left and the Victorian block is on the right. To give some idea of scale, Renmark and Mildura are about 130 KM apart as the Crow flies. Both Renmark and Mildura have their origins as the centres of the Chaffey Bros Irrigation Colonies.

THE WORK BEGINS

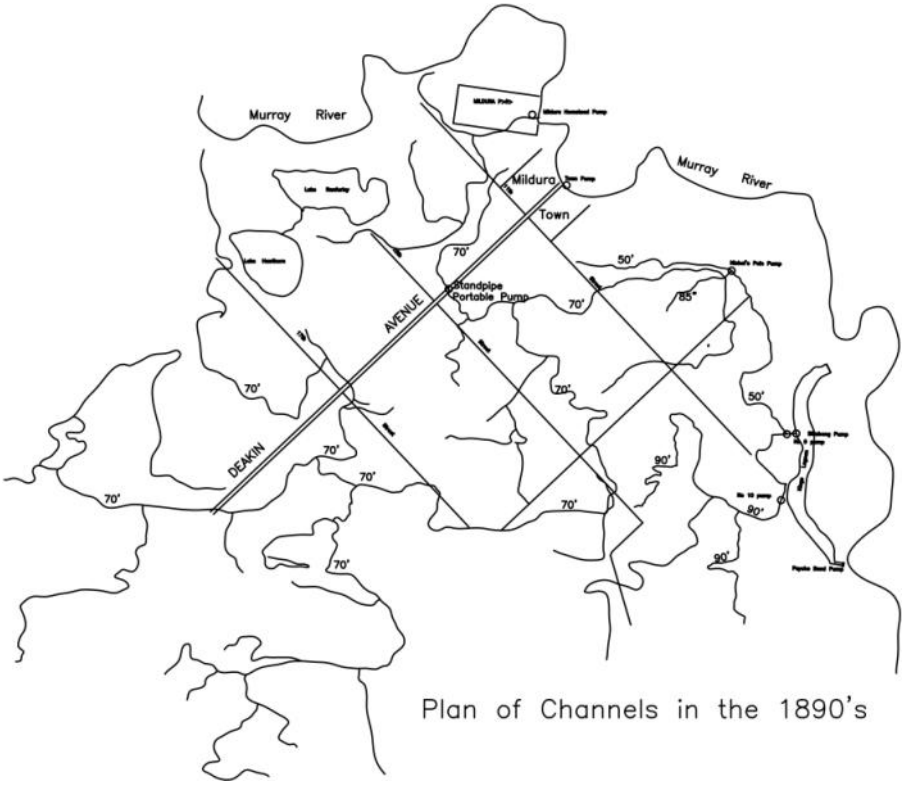
Unlike the Californian Irrigation projects, water had to be lifted from the Murray River up to 95' before it could be could be fed to the individual farm lot channels by gravity. Materials for making concrete and cement pipes were not readily available which meant that open channels would be needed to distribute the water. Surveys to determine the location of the contours that the main channels would follow were almost complete by the time that the Mildura documents were signed. The location of pumps were determined, their lift and

capacity were estimated and steam engines to power the pumps were designed and ordered. They hit the ground on the run.

The system at Mildura was expected to irrigate 40 000 acres. Kings Billabong was a natural old water course that typically filled annually when the river ran high in winter. Its upper water level was 16' above the low water level in the Murray River.

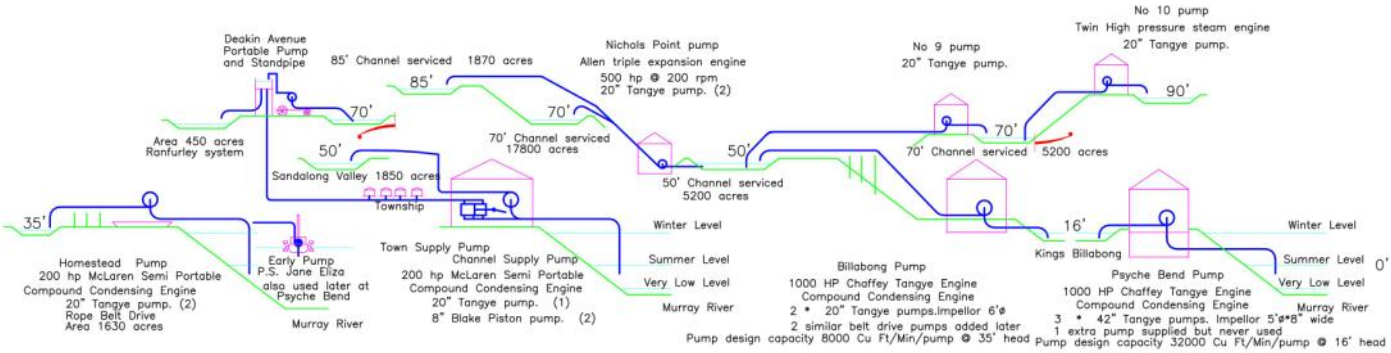
Both ends of the Billabong were blocked with dam walls to allow it to be used as a reservoir. The plan was to pump water from the river into the reservoir at Pysche Bend, and then use a second pump on the bank of Kings Billabong, "the Billabong pump", to raise the water another 35' to the 50' Channel.

A small section of the planned irrigation colony could be serviced by the 50' channel, but not all of it. Additional pumps would raise the required water to 2 channels at 70' for the bulk of the area, and to 85' and 90'.



Plan of Channels in the 1890's

Systems run from pumps at the Mildura Homestead and Town supply would run independently from the pump at Kings Billabong. The plan on the right shows the main channels that were in place in 1898, the bulk of them were there by 1893, and the schematic below shows the relative pump arrangements.



Schematic of early Mildura pump arrangement

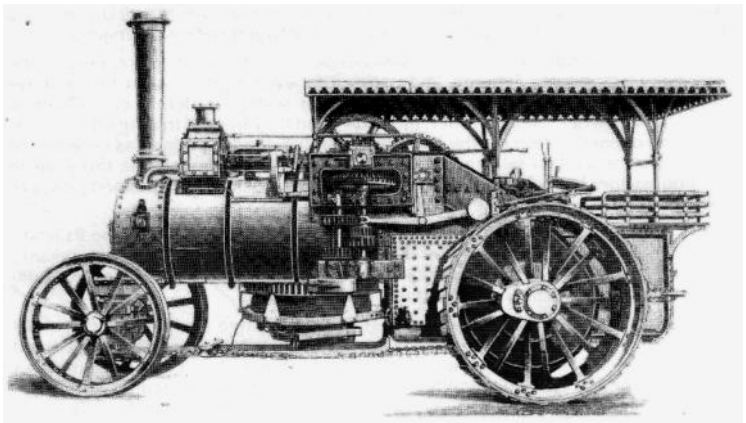
Pieced together from plans and various notes and records in 2019 Work in progress, confirmation needed.

The earliest pump was at the Mildura Homestead where the previous manager of the Mildura Run W. Paterson had irrigated their garden. He was retained to look after the property. The Paddle Steamer Jane Liza was purchased and rigged out as a floating pump until the permanent units were to arrive. The old Homestead became the temporary home and office.

With work well under way at Mildura George Chaffey moved to South Australia to commence work. Surveyors were engaged and work began determining where pumps and channels could be constructed. The Plan for Renmark followed. The Chaffeys were able to rent Paringa homestead for 2 years until permanent homes and offices.

Another brother Charles Chaffey moved to Renmark to control the project freeing George for the engineering plans for both Mildura and Renmark. William built a home "Reo Vista" in Mildura and Charles built "Olivewood" in Renmark., and offices were built in both cities. The company also had an office and home in Melbourne.

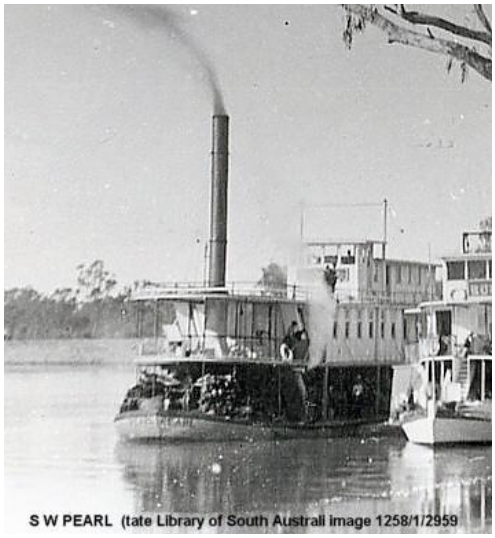
McLaren Traction and Ploughing Engines and ploughs were purchased in Melbourne and railroaded to Echuca for transport by Paddle Steamer to Mildura and Renmark. A total of 8 were in use by 1890. They were used to clear and plough the Mallee scrub, and help construct the infrastructure and install heavy equipment in both colonies. Peter McLaren, a younger brother of the UK family, was encouraged to move to Mildura to erect and commission the Traction Engines, the steam plant and pumps and to run the extensive work shop which was set up for the purpose and to manufacture and repair anything from river boats to ploughs. He married the Chaffey Brothers sister Emma.



In Renmark, a Priestman Steam dredge with a clamshell bucket was used to deepen channels, and a variety of portable steam engines were in used in both camps.

George Chaffy had designed over 20 inland water cargo boats as a Naval Architect, He had a Masters and Engineers Ticket at age 18. Earlier, he invented and developed an improved ship propeller which provided him a substantial income. In 1875 his ship "Geneva" was on a front page article in the "Scientific American" when it was considered the fastest light draft ship in America. In addition to Lake Ontario he also operated ships in the Ohio Valley, where his family had been before the move to Canada. Again he had fast ships, and on the Fraser River in British Columbia.

River transport to Renmark and Mildura from Goolwa or Echuca were an essential in 1887. Similarly, boat repairs at the same places were a liability. To solve the maintenance problem an existing repair facility in Goolwa was acquired and moved to Renmark, and they became the major share holders in The River Murray Navigation Co Ltd which owned the P. S. GEM, the P.S. RUBY & the P.S, SHAMROCK which were fitted out for comfortable passenger service.



S W PEARL (tate Library of South Australi image 1258/1/2959

Following his earlier experience he designed and built a sternwheeler, the S. W. PEARL (see picture on right) in the American style. The company prospered but the stern wheeler was not a total success in the conditions on the meandering Murray River. It had a shallow draft and it was fast on the straight but slow on the bends, and as with any stern wheeler it had difficulty towing barges which provided a lot of resistance in the paddle wake. The REARL was fitted with 2 * 36hp steam engines, displaced 213 tons and it was 110' long with a 24' beam. It was the first river boat built in Mildura.

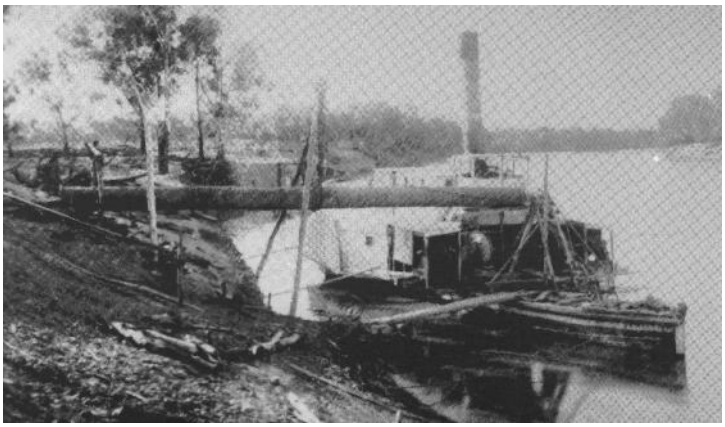
The Plaque on the right in Ontario (Canada) is one of a series recognising achievement.

Georges role in developing Mildura and Renmark, and the irrigated fruit growing areas was mainly concerned with all aspects of the engineering involved, raising capital for the projects and promoting the project to encourage new settlers to the area, many of whom arrived from Great Britain.

To build a town and community in the wilderness a lot of infra structure was needed.. 40 miles of rabbit proof fence were built, and Brickworks were set up, and a chaff mill for making Fire bricks for the Boilers. A refrigerated freezer and Cool store, water reticulation, and a saw mill with timber planning and moulding works for finishing houses. All of these were in operation by 1890.

Georges younger brother William was more involved with the horticulture and produce marketing which was necessary to adapt their successful experience in California. Soil preparation and preparing plant nursery stock were an essential, so that fruit could be produced at an early date and transported to markets on the fleet of paddle steamers.

In addition to his managerial role, he also started a 200acre vineyard, and later the Mildara Winery.



As this story is about the mechanical engineering behind the project, Georges involvement that will be the focus.

From an early time Red Cliffs had been considered as the point on the river to raise water. George Chaffey considered this a risk in the 1880's as he had doubts that the Centrifugal pumps available at the time could raise the huge volume of water involved 95' in one lift and then let it feed the area through main channels under gravity. It also meant that there would be no water available until the pumps were built and commissioned. Ultimately the plan was to install a large pump at Red cliffs when such a pump became available, and when sufficient area was under cultivation to need a high volume. At such time it was expected that the various pumps at Mildura would become redundant and be removed. In the meantime they could be brought into service as soon as they arrived to get planting underway as soon as an area was prepared.

The rope driven pumps and some temporary pumps powered by portable steam engines were the first to arrive and they were soon in action. The P.S. Jane Eliza riverboat (above) was acquired and rigged out with a pump and used initially at the Homestead to fill the 35' channel, and later at Psyche bend to pump water into Kings Billabong from where other temporary pumps elevated water to higher channels as planting got under way.

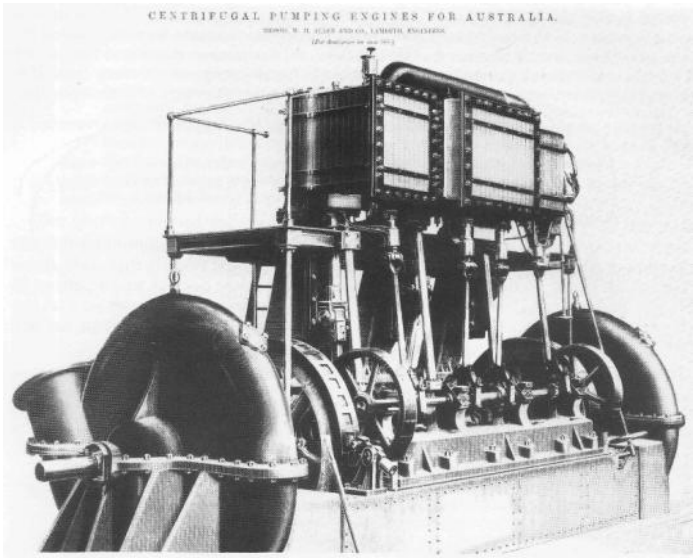
The Jane Elizer was converted back to cargo work when the permanent pumps were installed. This boat had quite a history, it had had its share of accidents, and had spent long periods marooned during low water which gave it a history of its own.

Information on the Renmark project is not as readily available as Mildura, and although it is just as interesting as Mildura, it did not have the large engines needed for the 40 000 acre Mildura project. So the Mildura project will be the focus here.

Centrifugal pumps had not been in use long when this project was started. The First one with curved impellor blades was shown by John Appold at the Great Exhibition in London in 1851. These pumps were available from various makers, driven by speed increasing belts or ropes from a steam engine. George Chaffey's marine background included propellers, which he had designed, driven directly from steam engines without any speed increaser.

The first new engines to arrive in Nov 1888 were the 200HP McLaren compound condensing engines driving centrifugal pumps by rope drive at the Homestead site and the Workshop. These got water to the project very rapidly as soon as channels were available. (I can only presume, that like the Traction Engines, these pumps were available on short delivery schedules)

A 27 ton 500 HP Allen engine (right from "The Engineer "Nov 1888) was ordered for the Nichols point Station. This Engine drove a centrifugal pump on each end of the crankshaft. It replaced a temporary portable engine previously at the site.



For the main pumps, one at Psyche Bend to pump water from the Murray river when its level was below the Billabong level, and a second similar engine, fitted with higher pressure pumps, on the banks of the Billabong to raise water to the Nichols point pumping station 35' above.

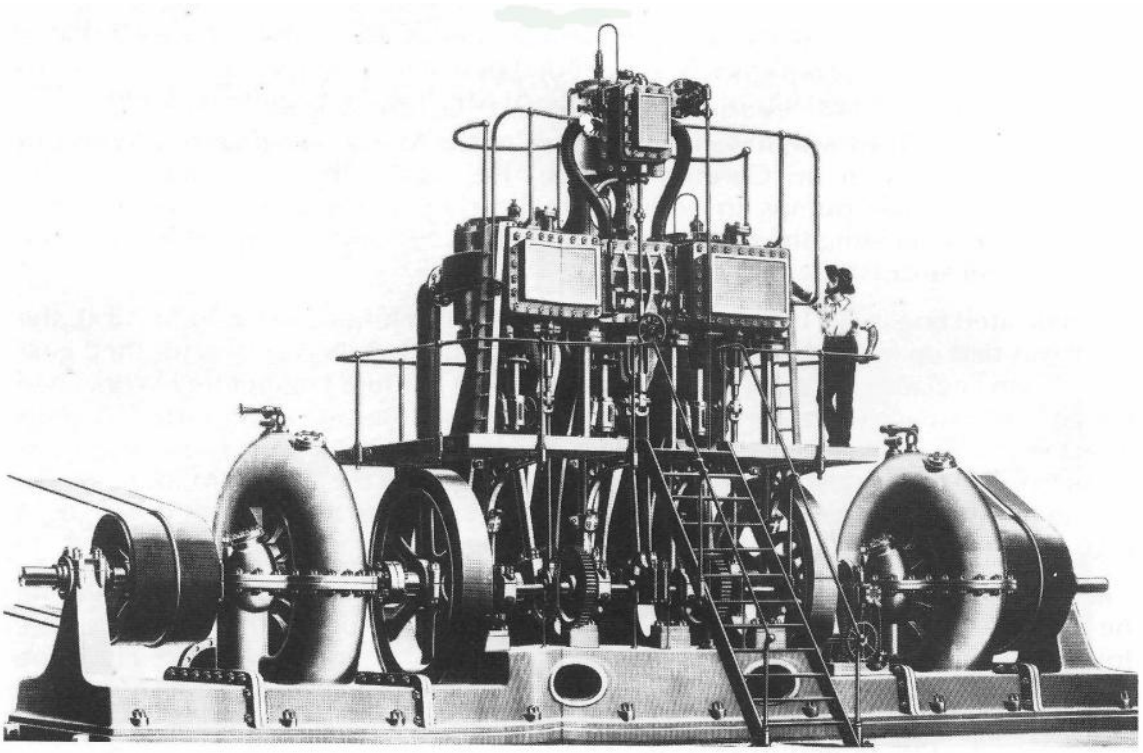
George Chaffey designed the concept of these engines, and presumably the pumps to be used in both locations. These engines were potential 1000HP Triple expansion condensing, ungoverned, non reversible types with valve cut off set at 60%. They used a manual throttle valve. Centrifugal pumps are directly mounted on the ends of the crankshaft.

Both engines were very similar'

The Billabong engine, the first installed had 2 by 20"Φ High pressure pumps with 6'Φ impellors, (later 2 more using a belt drive (see below)) with 6'Φ impellors and a cylinder barring engine to rotate the engine. Each displaced 8000 CuFt/Min at 35' head

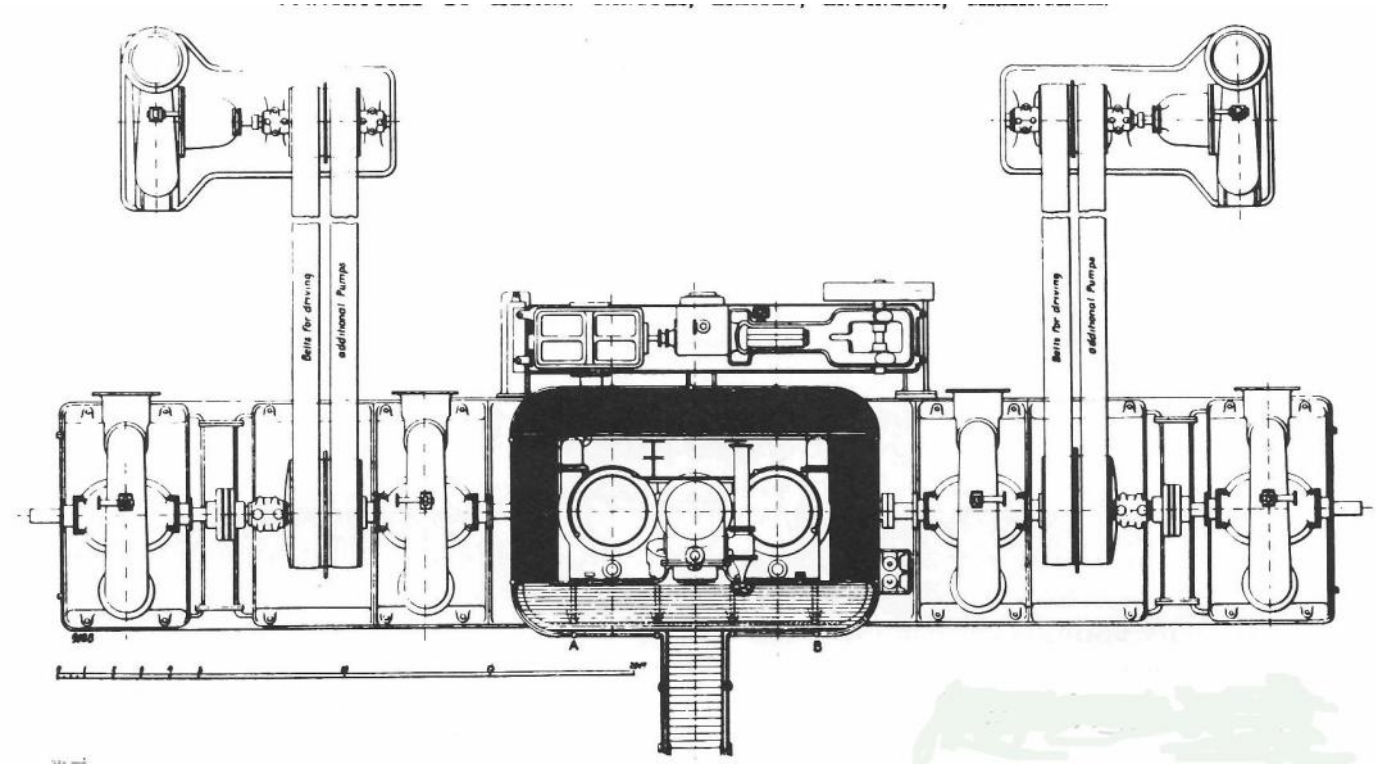
The Psyche Bend engine, had 3 by 42"Φ high flow pumps with 5'Φ impellors 8" wide (a 4th was supplied but never installed). The engine was rotated manually using barring leavers to bring it to the start position. Each displaced over 30 000 Cuft/min at low head.

Building of the engine and pumps was contracted to Tangye Ltd. in England. The Tangye engine name plate identifies the Chaffey name with itself as the manufacturer. It is believed that they had doubts about the performance of the unconventional design. The engraving below, of the Billabong engine and pumps from "The Engineer Jan 1889" in the State Library of South Australia gives a good idea of the layout for both pumping stations. The crankshaft was 7 1/2"Φ with 3 by 18" stroke journals. The centre journal handled about 75% of the power delivered from the tandem compound cylinder above it. The High pressure (140psi) at the top was 16 1/2"Φ and the intermediate cylinder below it is 24 1/2"Φ. There is a low pressure cylinder of 31"Φ on each side.



The condenser (Water cooled 8"Φ copper tube with a water jet spray) pulled 16" of vacuum and the independent condensate /

residual steam pump behind the engine has a 13" Φ bore and an 18" stroke. Early references refer to condensate being returned to the boiler hotwell. The reuse of condensed water would have saved fuel and reduced the use of river water with its suspended mud and dissolved salts and oxygen. There is no evidence left that this happened. There was provision to direct drive 4 pumps, although the outer pair shown below were never fitted, with the potential for 2 more via belts as shown (they were fitted later) on the plan from "The Engineer" Jan 1889 above. The Pumps had a vertical suction and low horizontal discharge line fitted with hand open-able check valves. There were no foot valves in the suction line.



Each pump was fitted with a steam inlet on top of the case to prime them by replacing the air in the pipes with steam. When the steam collapsed it formed a vacuum which drew water into the suction line while the pump was turning slowly. When the priming was complete the engine speed could be increased until the required water discharge was achieved. Four pumps, were rated at 8000 imp gallons each per minute against a 35' head. The combination could deliver 46 000 000 gallons per day when the second pair were added, a record at that time. (That's 209 Mega litres/minute).

The unbalanced flat plane crankshaft had the potential to stop on TDC and prevent self starting. To overcome this possibility, and for general maintenance the Billabong pump Engine (now an outside display), was fitted with a barring engine which has been "lost" leaving the manual worm drive. The missing Flywheel was damaged with the crankshaft which broke in 1902. It was never replaced. The balance weights visible were added later as an alternative. The engine ran for 57 years without it. This engine normally ran with 2 pumps in it's early life, but later 2 more were added driven by belts. The pump impellors are 6'Φ and the twin volute suction and delivery lines are 20"Φ. None of the high pressure Billabong pumps have survived. 3 low pressure pumps remain at Psyche Bend. New light weight low pressure pistons were fitted to the Psyche bend engine as a precaution.

The pumps were used in balanced pairs on the Billabong pump, and power was delivered equally to each side of the centre cylinder. Unlike ships engines, and most others, these engines were designed to deliver power equally to both ends. These pumps had a heavy duty cycle and both broke crankshafts early in their life, and one developed a crack that was plated over until a new one made by Commonwealth Engineering was manufactured and installed around the 1920's. the replacement ran trouble free until 1959 when both pumps were shut down after the arrival of enough electricity to run electric pumps.

The Billabong pump was the first engine arrived from England in late 1889 and was towed up the Murray from Morgan and landed in place when the river was high enough to allow the barge into the Billabong. The installation was completed in January 1890. The maker, Sir Richard Tangye arrive to witness the start up.

The "CULTIVATOR" reported the moment

" This ponderous machinery was set in motion on February 12 1890 and went full speed without a tremor or the slightest cause for anxiety".

The second engine & pump arrived some time later via Echuca. In the meantime the Jane Eliza pumped water to the billabong.

The various pump house's were connected by telegraph so that the pump output could be matched to the demands of the channels and downstream pumps..

Tangye's were quick to promote the success of the Chaffy designed Tangye built pump engine. Tangye's soon had there own direct drive steam centrifugal pumps in production, and Chaffey's used them at Renmark.

In 1894 George Chaffey was elected as a member of "The Institute of Mechanical Engineers in London in recognition of the reliability and output of these triple expansion engines with their directly driven pumps.


THE AUSTRALIAN IRRIGATION COLONIES.

TANGYES LIMITED

CORNWALL WORKS, BIRMINGHAM.

SYDNEY: HAY STREET. MELBOURNE: COLLINS STREET WEST.

LONDON: 35, Queen Victoria Street, E.C. MANCHESTER: Deansgate.

NEWCASTLE: St. Nicholas Buildings. GLASGOW: Argyle Street. PARIS: Place de la Republique.

TANGYES' IMPROVED CENTRIFUGAL PUMPS

As supplied to the British, Colonial, and Foreign Navies and Merchant Services, Dock and Pontoon Companies, and for Irrigation and Sewage Work.

SINGLE AND DOUBLE STANDARD CENTRIFUGAL PUMPS.

"ARCHER" CLASS.

DOUBLE STANDARD.

The above illustration is taken from a drawing of the first set of Triple Compound Condensing Centrifugal Pumping Engines, being made by Tangyes Limited, for Messrs. Chaffeys' Irrigation Colony at Mildura, Victoria, Australia. The following are some of the principal dimensions, viz.: High-pressure Cylinder, 16½ inches diameter by 18 inches stroke, for an initial pressure of 140 lbs. per square inch; Intermediate Cylinder, 24½ inches diameter by 18 inches stroke; Two Low-Pressure Cylinders, 31 inches diameter by 18 inches stroke. Each Pump has a disc 6 feet diameter, and the suction and delivery branches are 20 inches diameter; the minimum duty of the two Pumps together being 16,000 gallons per minute, which is intended to be pumped from the River Murray to an elevation of 30 feet. In addition to the two Pumps shown above, four others will be driven simultaneously from these Engines—two coupled direct to the extreme ends of Pump Spindles (the base being extended for this purpose), and two to be driven by Belts from the Pulleys shown. All six Pumps are of the same capacity, the Engines—which in general design are as prescribed by Messrs. Chaffey—being of sufficient power to drive them all with ease.

STEAM ENGINES AND BOILERS OF ALL CLASSES.—Compound, Condensing, High-Pressure, Quick Speed, Automatic, Horizontal and Vertical Engines. —Special Type Steam Engines for Electric Light on Steamers and like positions; Winding and Hauling Engines.

PATENT POSITIVE-ACTION DUPLEX PUMPS.—For Collieries, Mines, and General Works—for Petroleum Ships, Water Ballast, Donkey Boiler Feed Pumps —for Water Works, and for Operating Hydraulic Presses, &c., &c.

HYDRAULIC MACHINERY.—Cranes, Lifts, Hoists, Accumulators, Presses, Lifting Jacks, Shears, Punches, &c., &c.

MODERN MACHINE TOOLS.—Lathes, Drilling, Shaping, Slotting, Planing and Milling, &c., Machines, and Wood-working Machinery.

LIFTING APPLIANCES.—Weston's Blocks, Rope Pulley Blocks, Overhead Travellers, Patent Safety Hoisting Cranes, Screw Jacks, &c.

For particulars see General Catalogue and subsequent Price Lists issued by the Company and obtainable at any of the above addresses.

This was quite an achievement for someone who left school at 13 and educated himself to a standard that allowed him to assess problems and implement practical innovative economical solutions and make full use of advancing technology. Knowledge and experience gave the Chaffey brothers the confidence to tackle major projects and overcome problems encountered along the way.. In the case of Mildura, an outback station of 150 000 acres that failed trying to run 6000 sheep is now a hub of food production supporting over 65 000 people. If lists were made of the Chaffy achievements and shortfalls the successes would smother the failures.

The irrigation colony got off to a good start with excellent crops of fruit. There were some early problems sealing Channels, the great unknown was the Yabby and the Murray Cray that burrowed into the channel walls and added to seepage and caused setbacks. Sections of the Channels had to be lined.

Crops came on line in the 1890's and demonstrated the technical success and implementation of the irrigation system at Mildura.

Unfortunately the rest of the world seemed to go the other way. The river level dropped and the expected railway did not arrive, so getting product to market was a major problem. The depression of the 1890's made capital impossible to raise, and the population of Mildura dropped, and no new starters arrived. Capital went back to Britain, land prices crashed and banks failed and foreclosed on mortgages. George went to London to try and raise capital by separating Renmark from the Mildura project. The effort failed and the company went into voluntary liquidation.

The Government called a Royal Commission to enquire into the circumstances, recommend changes and appoint blame. The First Mildura Irrigation Trust was formed to take responsibility for the irrigation water,

In 1896, with no further engineering works foreseeable, George and his family returned to Canada and the USA and became wealthy in irrigation projects and banking. One son, Ben stayed in Australia and formed the Gem Navigation Co. to take over the River Boats. He became wealthy as a cattle farmer with extensive holdings along the Darling.

Charles stayed until 1907 when his assets were auctioned off at Renmark, and then returned to North America.

William stayed on in Mildura and expanded his vineyards and Formed Mildara Wines. He repaid all debts following from the liquidation and became Mayor and remained active in local affairs and the promotion of local business.

There is a lot of information available on the Chaffey's and the irrigation areas of Mildura and Renmark. After 1896 the area got back on its feet. The area under irrigation grew until the pumps at the Billabong were supplying water to 50 000 acres, way beyond the designers 40 000 after 66 years in service when they were shut down and replaced by electric pumps at nearby locations. The original Chaffy Billabong concept still remains 130 years later. The performance of the pumps was updated throughout their working life.

Paddle Steamers to Cornucopia by Sydney Wells ISBN No 186252 467X

The Desert Blooms Andrew C Ward ISBN No 0 9589942 2 2

Chaffey's Kingdom The Sunrasia Story ISBN No 0 333 22917 7

The Early Years Kaye Voullaire ISBN No 0 9596456 2 4

From the internet, The State Library of South Australia , Engineering Heritage Australia and numerous other sources have been usefull in preparing this short background behind the Psyche Bend Pump.

This brief story has tried to highlight the engineering aspects of the Chaffey Brothers achievements, and the Psyche Bend pump in particular as they were installed. The referenced books provide a lot more of the history along the Murray River from Renmark to Mildura.

They also cover the political intrigue and difficulties trying to establish such a project at the corner of 3 states with different laws, customs duties and vested interests. Amazingly it also shows how some people can act against their own interests. The whole adventure is an incredible story, and for anyone interested in Australiana there is plenty to catch up on.

Soon after it arrived in the 1890's, before the federation of the Australian states, the Victorian Government declared the Psyche Bend building a bond store which delayed paying the £2000 duty payment which was postponed until the engine left the bond store. 130 years later it is still there in pristine order pumping water and amazing visitors on the days when it is brought back to life by the volunteers at Psyche Bend. This engine is believed to be the oldest triple expansion steam engine in working order.

Its long working life, and its role in demonstrating that large pumps could be used in remote locations to turn deserts into gardens, and its role in the formation of the Sunrasia food bowl give it a unique place in Victorian horticultural and mechanical heritage.

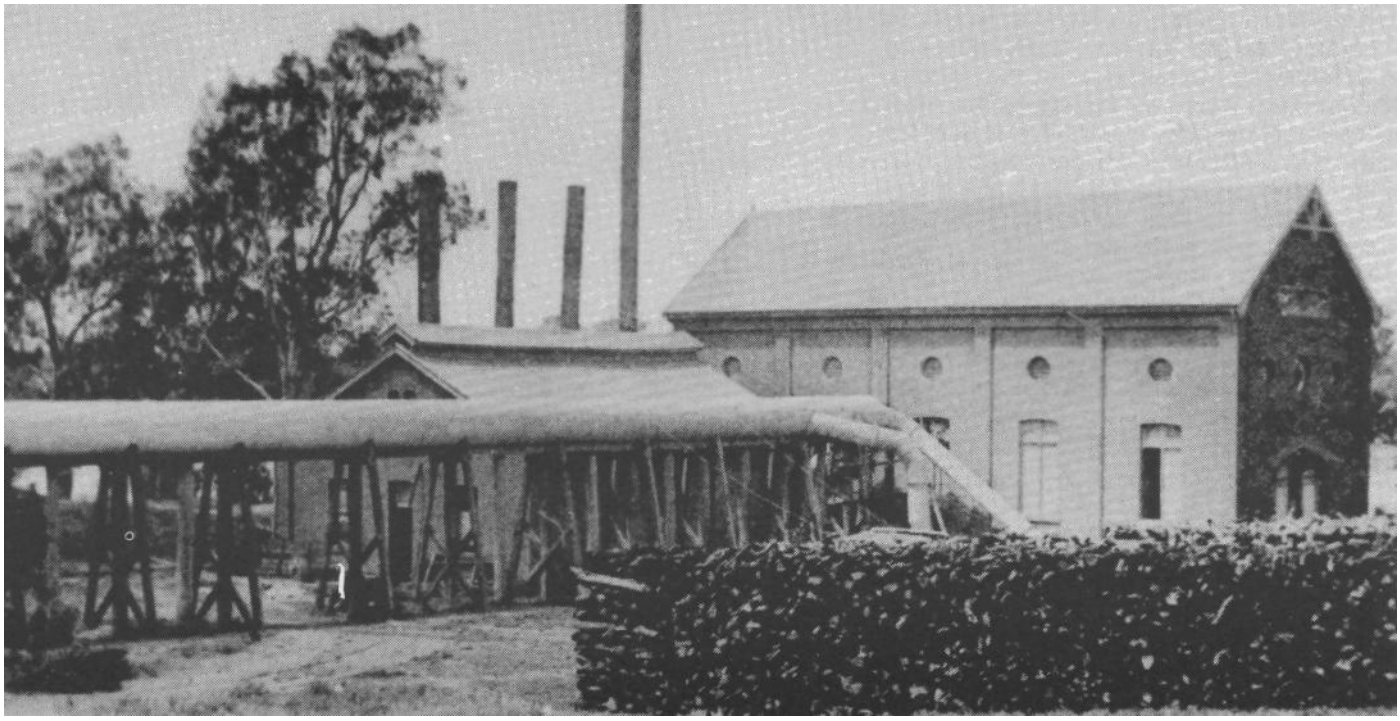
The plate on the left from 1890 held in the State Library of Victoria shows the early irrigation ditches

and a rabbit proof fence with the mesh buried 6". There were over 40 miles of this type of fence installed.

Today the horse is gone and the crops are lush with this modern Leda AG grape picker going thru its paces.

The other industry that had to be established before the colony was established was timber and firewood.

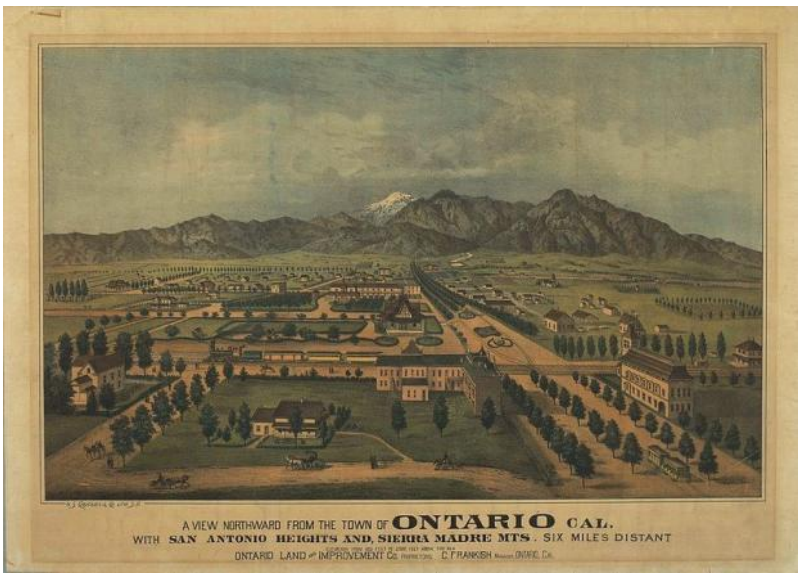
Timber was used in fences, vine trellis and building. The big user was the boilers used to generate steam for the pumps.



In the 1890's the boilers were using 10 000 tons of firewood a year (it had trebled by the 1950's). 3500 tons was held in store to dry before it was burnt, as can be seen above at the Billabong pump yard with the 4'Φ pipe to the fifty foot channel and Nichols point.

The timber industry included axemen, cartage, riverboats cranes & light rail to get it to the boilers. From the left, George above the Paringa Homestead near Renmark, William above Rio Vista in Mildura and Charles Chaffey above Olivewood, the home he built in Renmark.

The Picture bottom left, is an artists impression of Orlando in California. Deakin Avenue in Mildura was envisaged as a similar wide tree lined Boulevard with a central horse drawn tram. The trees planted in Orlando were Australian Blue Gums.

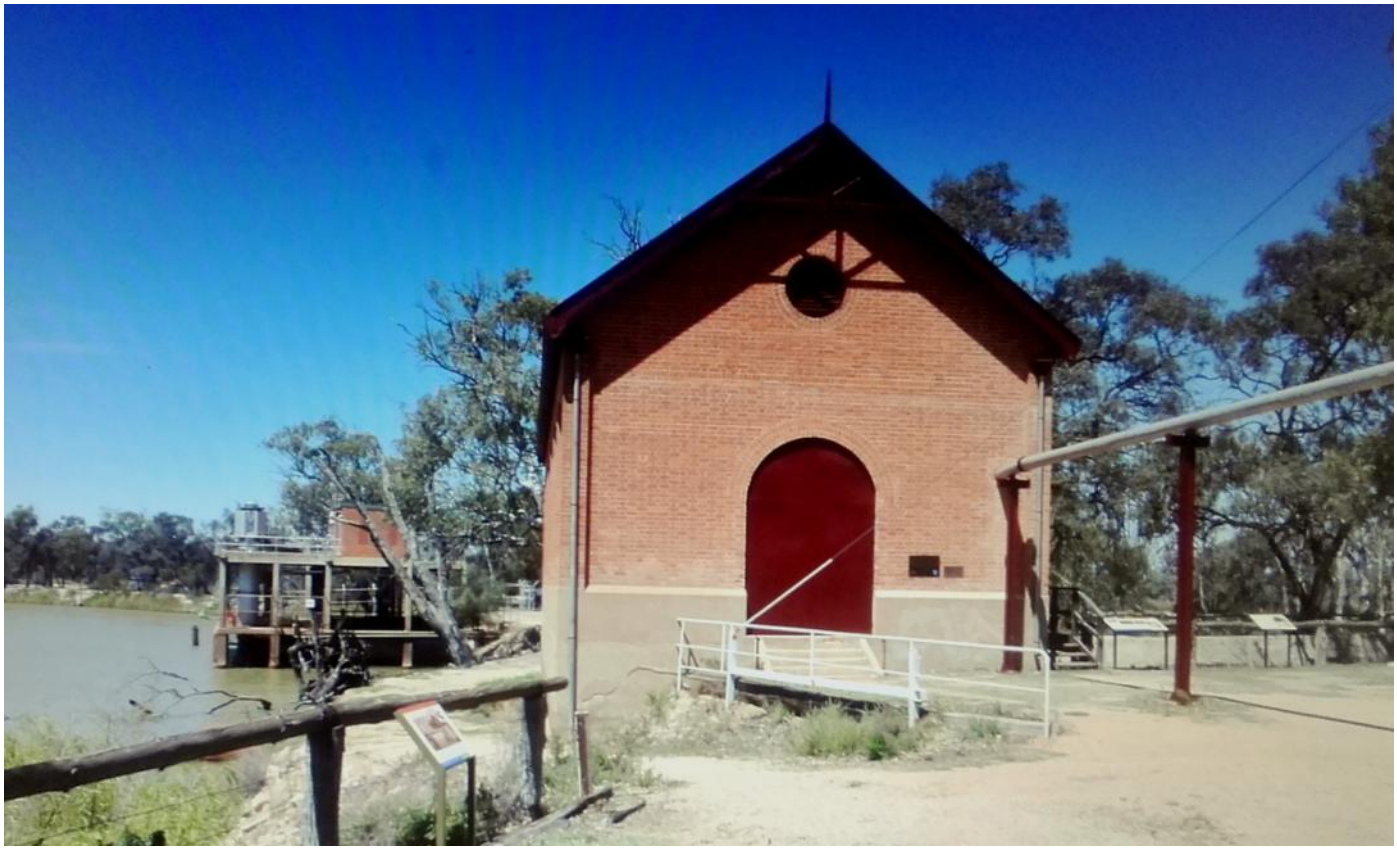


Like Mildura, Orland is a thriving city built from thr vision of the Chaffey Bros who turned desert into Gar-

Below is the Psyche Bend Brick pump house at the head of its channel into Kings Billabong as it stands today The three 42" Φ discharge lines from the pumps can be seen protruding from the pump house wall that sits on 14' of concrete on the river bank. On the left is the

new Boiler House with its Victorian N Class Locomotive Boiler. The original Boiler house and boilers were demolished when the pumps were decommissioned after electricity arrived.

Below, the Murray River can be seen on the left, and in the background are the "New" vertical shaft electric pumps that took over the job of filling of Kings Billabong. The steam Billabong pump duties have also been taken over by the "Central" electric pump station.



The Google Earth map on the lift gives some idea of the Mildura Red Cliffs area as it is today. The river still meanders along between its banks, The area that it irrigates is scarcely recognisable from the Mallee scrub that could not support a sheep on 25 acres before the Chaffey Brothers combined their Engineering and Horticultural talents to pump life into this semi desert.

It is amazing that the Psyche Bend Pumps survived more or less intact in their original Pump house for nearly 130 years.

That they have been brought back to life, and can still pump water into the Kings Billabong to be taken up into the new irrigation system makes a visit on steaming days a trip back into living history. If you like heritage machinery, fascinating history and steam. The Psyche Bend Pumps should be on your bucket list.

Thank you to everyone who has had a part in bringing this mighty machine back to life. Ed

ACMOC GOES TO SANDSTONE 2019

Thanks to Dave Richardson & Andy Selfe for the pictures. See TOMM issue 203 June 2019 Page 48 for Neil Clydsdale's story. Ed.

Queens Birthday in Beaufort June 2019

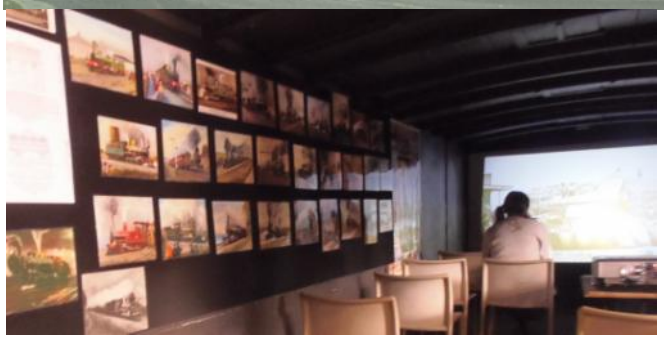
The Lake Goldsmith Railways Goods Shed was a drawcard for anyone with an interest in heritage preservation. Pictures & videos of Beaufort's past were on show in the 19th century railway carriage inside.

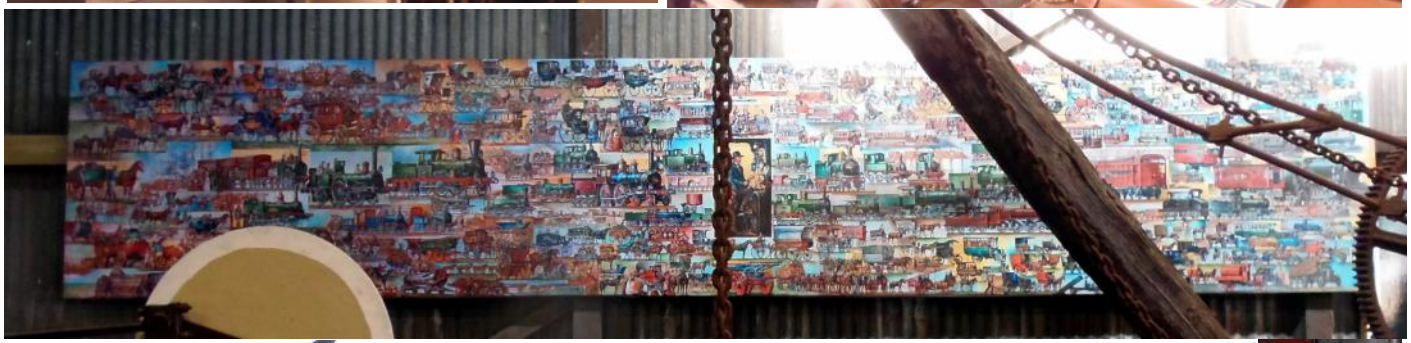
Historic railway and steam machinery, along with railway models and relics from the horse drawn era were on show inside and out.. A Cowley Steam roller made in Ballarat nearly 90 years ago shared the load towing crowds through Beaufort with 2 Steam Traction engines.

A large crowd attended the Gold Coin donation event which was open on the Saturday and Sunday. A variety of Classic cars joined the Veteran and vintage cars and tractors scattered around the grounds while colourful model steam replicas moved around the grounds.

A good time seemed to be had by all, and Ron & Linda Harris who organised the event would like to thank everone who displayed their gear and helped out during the event.

And a special thanks to those who visited the show on a beautiful June weekend . We look forward to a repeat event in June 2020. The background work put into this event for the past few years is paying dividends in crowd numbers at this central venue in the heart of the Beaufort heritage precinct.

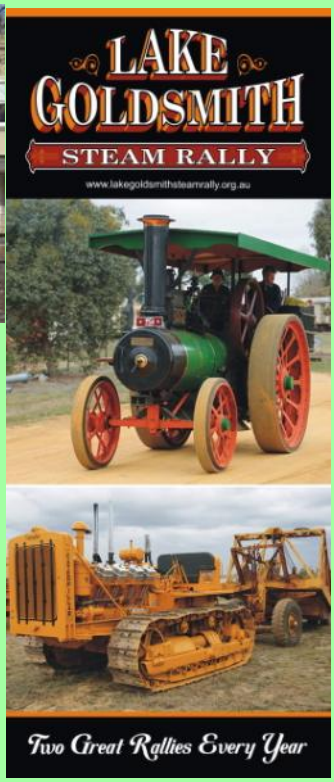




Beaufort 2019

LAKE GOLDSMITH
GOODS SHED MUSEUM
& VISITOR CENTRE

Queen's Birthday



Beaufort came to life again with the sound of steam and some veteran, vintage and Classic cars over the Saturday and Sunday of the Queens Birthday long weekend. A good turnout, a great event, and looking forward to next year.