Front Cover
Neil Meyers and Warwick Bryce laying the blinding concrete to form the base of the Willans foundation block.
John continues What did become abundantly clear was that the major player in the world of torpedo propulsion was the UK engineering firm of Peter Brotherhood, a company which is currently celebrating its 150th. anniversary, and still very much involved with steam turbines. I made contact with James Richmond of Peter Brotherhood who very kindly supplied some of the information and photos for this article. It would be virtually impossible to cover every variant in torpedo propulsion, so I’ve decided to focus only on the propulsion motors of Peter Brotherhood. Steering, depth control, explosive charge and methods of arming are a subject of their own so I make no attempt to discuss them here.

A Very Brief History:
Torpedoes, configured as we know them today, evolved from an idea in 1864 by Captain Giovanni Lupis of the Austrian Navy. Although more of a sea mine than a torpedo, the potential of the device was recognised by an English engineer, Robert Whitehead. (Later Sir Robert who was then based in Fiume (present day Croatia) rather then adopting one of the many crude methods of delivery to target, his solution was to introduce a small motor thus making the device self-propelled. After a number of false starts - which included a clockwork motor - the prototype that finally emerged is clearly recognizable in the torpedoes used by modern day navies worldwide – a long cylindrical tubes, a modest explosive charge at the pointy end, external propeller and fins and rudder at the other, and the propulsion and guidance systems somewhere in between.

Propulsion Engines:- Oscillating
Having decided on a device which was ‘self-propelled to target’, the next hurdle to overcome was the method of propulsion. Steam was out of the question (at this stage) so the system chosen was a twin cylinder, compressed air oscillating engine with the cylinders configured at 90 deg. (not unlike those found on metho fired toy donkey engines) driving a 3 blades propeller.
Radial Engines  The next significant development came in 1875 with the replacement of the twin cylinder oscillating engine with a purpose-built, all bronze, Peter Brotherhood three cylinder, single acting radial engine.

Left Peter Brotherhoods experimental traction engine powered by such a motor. Pics courtesy James Richmond, Peter Brotherhood Collection. 2017.

Configured with this engine and the introduction of contra-rotating props the torpedo now had a range in excess of 700 metres at 55 km/h. The mass of the explosive charge in the warhead had also increased by a factor of 10 making the torpedo a very formidable weapon indeed.

Right Hayden Sharpe’s Peter Brotherhood 4 cylinder radial torpedo motor on display at the National Steam Centre museum building 6.

Ed It had a range of 900 metres @ 75 km/h.) This combination became the industry norm and remained so for many years, albeit with higher pressures and a variety of fuels which ranged from pure oxygen, to hydrogen peroxide, to kerosene, to the present day OTTO fuel. (A synthetic fuel containing nitrates that therefore burns without needing an outside source of air). Ed

Note: Date-stamped 27.10.17. Hayden’s motor is only months away from celebrating its centenary!
Adding Heat  One of the major short-comings of throttling high pressure compressed air (or any gas for that matter) to pressures more suitable for reciprocating engines, was it’s tendency to freeze the pressure reducing valve where the gradually falling HP compressed air supply was reduced in pressure in an attempt to govern the speed on the engine, and therefore enhance guidance, depth control, range and of course speed, of the weapon. Pre-heating the LP air by various means – including using the relatively warmer sea water - not only overcame this problem to some extent, but the air at higher temperature also increased running times and performance, Propulsion motors and fuels were further developed, eventually evolving into the 4 cylinder versions running compressed air and wet heaters.

The burner and semi-diesel variant were very much to the fore right through WWII and well beyond, with the MK VIII figuring in the historic sinking of the General Belgrano during the Falklands conflict in 1982, the only example of a ship being sunk by a conventional torpedo, fired from a nuclear powered submarine (S48) HMS Conqueror.

Local Production  Whilst researching this article, I was surprised to find that during WWII, torpedoes were made right here in Australia in 1942, by the RANTF – Royal Australian Navy Torpedo Factory - in Sydney, the engines being manufactured by GMH. At Fishermans Bend

Above  Complicated ancillary equipment required to regulate air temperatures and pressure. Pic Maritime Museum, Fremantle WA. Author’s collection.

Semi Diesel Cycle  Historically, the Peter Brotherhood motors were one piece bronze castings, but with the introduction of the burner and semi-diesel cycle came higher temperatures and piston speeds. To counter the higher stresses of these motors, steel cylinder liners and demountable steel cylinder heads were introduced, the number of cylinder head studs being an indication of the extreme pressures employed.

Above “Suits” and “Brass” inspecting GMH production.

Below Holden promotional photo of the torpedo engines produced at Fishermans bend. Internet photos

Left  Note the complexity of the Peter Brotherhood 4 cylinder radial “Burner Cycle” semi-diesel engines. Comparing the photos leaves no doubt that the engines Holden produced were of the Peter Brotherhood type.

pic courtesy James Richmond Peter Brotherhood Collection.

John Horward continues—But of particular interest to me was the fact that many of the high precision components were manufactured at the “OFB” -the Ordnance Factory Bendigo, my apprenticeship and trade ticket alma mater. Although never involved in the manufacture of torpedo —>
components in my time, I do remember that we did carry out maintenance on a number of deck-mounted torpedo tubes.

**In conclusion,** torpedo propulsion motors came in many shapes and sizes, from oscillating cylinders, double acting, swash plate multi piston variants, right up to electric, steam and gas turbines of today, any of which would be a subject in their own right.

The pics Left & Right are but two of the many versions, some of which saw active service. Others never left the drawing board.

Hopefully this article will inspire others far better qualified than me to dig a little deeper as it’s a fascinating subject, and very much in line with our Club’s activities.       John Horwood

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**All a Board !**

Ken has been busy again and creating a fantastically detailed wooden model of our tram from an old red gum fence board. When I heard about it I thought it would be a comparatively simple model so imagine my surprise when he lifted off the roof and I saw the fully kitted out interior, seat, handrails and drivers compartment. Oh and a curious looking wire hook! - to open and shut the tram’s full set of bi folding doors.

Ps the full sized tram and BBQ really came into their own for our Vauxhall club’s visit with last weekends inclement weather.

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**Here Torpedoes on display at the National ANZAC Centre, Mt.Clarence, Albany WA.**
The torpedo on the left is a MK VIII, a very reliable and long-lived version.  
**Pic author’s Collection 2017**
Scrapyard Special. Photos by Bob Tuck and Peter Lynch.

Members may recall seeing this battered 1970 Atkinson truck cab at MSTEC in 2013 while Peter Lynch prepared it for shipping to England. It has taken about four years but that Aussie cab is now beautifully restored, fitted to a UK chassis and attracting great interest over there.

Peter Lynch writes Right is the finished result the one off Skippy (Australian) cabled Atkinson Borderer of Richard and Len Beckett next to it's English cousin. Photo courtesy Bob Tuck.

Warwick continues — Actually “Atki Pete” Lynch is being a bit modest about his involvement in this project. The full story has just appeared in English magazine Heritage Commercials as their feature article for issue August 2017 and extends to no less than 7 pages. Apparently these big Atkinsons were unique to Australia and in 1967 a major UK haulier who ran a fleet of Atkinsons was so taken by these big variants when visiting the outback that he had one built for him back in the UK.

Fast forward now to Australia and 2007 when Peter Lynch wrote a book Atkinson Down Under with the summary: “The small Australian subsidiary produced powerful and innovative vehicles to meet transport tasks well beyond their English cousins ….. The Australian Atkinson is in an entirely different and superior league”. With this wrap UK Atkinson enthusiast Richard Beckett just had to have one but the UK truck is no more. Peter Lynch was roped in and soon got a rough cab from Timms wrecking yard and brought it down to MSTEC where he prepared it for shipping to the UK.

Some of our members will remember seeing it on the arena and making comments about what is this junk doing here?. Well now you know 4 years later Atkinson fans in the UK are “being blown away by this absolutely stunning re-creation of a
hugely distinctive piece of Atkinson heritage.” (Bob Tuck Heritage Commercials Aug 2017).

Our small part in this is not going unnoticed with Peter Lynch reporting. Owners Richard and Len Beckett greatly appreciate the efforts of MSTEC members with this project. They also have a similar truck with the standard UK cab which they use to transport their vintage tractors to events.

Looking at the picture on the previous page of this yellow truck with it’s whoosy rounded cabin you can see why they rave about the Australian version. Ed.

Left Cover scan of August Heritage Commercials magazine features the English Atkinson chassis now fitted with the old blue cab that was sitting sadly on our arena 4 years ago. You must agree what a splendid outcome for what was deemed junk by most.

Below Peter Lynch and his iconic old Red Dodge we are so used to seeing also features in the article. Acknowledgements Heritage Commercials

Left In reality to fully represent the Aussie version they need to fit a more powerful Cummins engine and an extra drive axle as per MSTEC member Peter Jackman’s truck photographed on the very arena that the “Skippy” cab departed from 4 years ago.

Right If Richard and Len need another project then of course there is always the final Aussie Atkinson reincarnation produced by International Harvester shown in this internet picture on outback road train duties. Actually MSTEC member Peter Morris has such a truck that can occasionally be seen at the club. Warwick Bryce
Willian Foundation Underway

Bill and Warwick’s work paid off with the first concrete for the foundation going in on 22/8. See cover photo

Left The first step was constructing formwork for the block. Thanks to Bill’s expertise 19 m of formwork panels 2.1 m high have been constructed from BONDEK rolled steel decking.

Right Before installing the formwork a black plastic moisture barrier was laid.

Next stage will be constructing a cage of reinforcing bar around which the main body of the foundation will be poured. More elaborate boxing will then be made to form the upper surface and the remainder of the concrete then poured.

Hayden’s Show Case -Transistor Radios

As you know Hayden Sharpe has set up a show case in Museum Hall 6 to house revolving displays of members artefacts. This time round it is a selection of Ian Malcolm’s portable transistor radio collection all made in Australia between 1957 and 1974. They mostly used specialized batteries also made in Australia by Union Carbide under the Everready brand. Unlike later sets that were made overseas for a world wide market a number of these have dials the show the various station’s specific call sign rather than the more generic frequency. Remember that? What was once a thriving industry disappeared very quickly with the introduction of FM band stations that made local production unviable.

Lucknow Steam Air Compressor

Club visitors should have noticed this strange device offloaded on to the arena. Donated by the Lloyds it is a vertical steam engine with compressor cylinder added on the top. Look forward to the full story in Steam Supreme soon.
It will be a big exercise as it is totally unrestored and largely dismantled. With the exception of the front wheels it appears to be basically complete but the condition of the boiler is unknown. The distinctive “fire proof” chimney casting is broken and the gauges, governor, relief valves and other fittings are missing. A complete survey will be the starting point.

My desire to own a Waterous engine was sparked by the discovery that my great great grandfather was in partnership with Waterous in a company manufacturing steam engines back in the 1840s. Great great granddaddy was a colourful character who lived in an interesting time when slavery was ending in the British colonies and steam was transforming transport and industry. The family had big holdings in sugar plantations in British Guiana. The British government handsomely compensated them for the emancipation of the 500 slaves they had on their plantations. They were awarded an amount that translates to about twenty million in today’s dollars and great great granddaddy set off for a new modern life in Canada. It did not succeed as he hoped. He eventually sold up his interest in Waterous Vanbrocklin and Winter and blew more of his fortune in a failed railroad venture before setting off for New Zealand in reduced circumstances. (According to family folk law he was accompanied by a large consignment of guns for the Maori wars)

All this happened long before Waterous began manufacturing the fire proof champion portables but my interest was piqued and I thought that if ever a Waterous became available I would like to buy it. Research showed that Waterous had been quite successful throughout North America with a strong customer base in portable engines and steam fire pumpers. In fact the company is still active manufacturing and selling pumping equipment today. The only Waterous steam engines I have been able to track down in Australia are four Fireproof Champion portables and now one of them is mine. It is an interesting engine and worth possessing for more than just a tenuous family connection.

These distinctive portables with their vertical boilers were made in Canada from 1875 until around 1890 when they switched to making engines based on a more...
conventional locomotive style boiler. The old vertical design appears to have been a reasonably successful with adverts proclaiming that 1800 had been sold. As they were largely used for thrashing and chaff cutting the fire proof claim was an important marketing feature. Their bulbous chimney shape is designed to prevent cinders being ejected. The flue gasses are directed through a U path with water at the bottom of the U.

Sweeping the tubes must have been an interesting exercise. First you would have to flip the chimney down then clamber up on top to push the tube brush through the 100 1 inch tubes. Perhaps that was part of the reason for the change over to the horizontal boiler.

Google was able to turn up only a very few of these portables in North America. So this is a fairly rare survivor. Here in Australia there is a very nice example restored to operating condition in the Inverell museum. Its wooden wheels suggest that it is older than ours.

Another Waterous briefly popped its head above water in lake Eucumbene during the last extended drought. It was abandoned there when the Snowy hydro scheme was being developed. It is now back beneath the water and being in a National Park is likely to remain there.

The third Waterous is a couple of sizes larger than ours. It was collected and restored by the late Reg Schuster. Reg found pictures of a Waterous traction engine and took some liberties modifying his engine to this format. The resulting machine was terrifying to behold and must have been a nightmare to drive. We had two attempts to buy this engine at auction. At the first auction it was passed in with us as the highest bidder but Reg must have had a change of heart about selling it as he would not negotiate a selling price. When it again came up for auction as part of Reg’s estate we were one of only two bidders but when the price got to twice what we had agreed was reasonable we reluctantly dropped out. It was purchased by a local with no steam background. He has since had a change of heart and offered it to us just too late. The fourth Waterous and the one we have ultimately purchased came up for auction at a clearing sale in Bathurst. This time the auction went our way and we picked it up for well less than we had been prepared to spend leaving plenty for a few extravagances during the restoration.

KEEP AN EYE OUT FOR UPDATES IN STEAM SUPREME AS I TACKLE THE RESTORATION PROJECT. Jo Lloyd -->
The Waterous Jo bought as first seen at the Bathurst clearing sale. Although the engine was stripped it came with most of the parts Jo Lloyd pic.

A Nice Thought from Turkey

I am writing to you from Turkey and I have an antique steam machine that supplied electricity back in 40s and 50s in my village. It was used as a lumber mill after 50s. However it is not used after 60s and it is not renovated or repaired after 90s. Since I cannot tend this machine, it will continue to get rusty as time will pass. This machine is a heritage from my great-grandfather and I don't want it to be wasted. It was bought from Germany in 1930s. Its brand is Th.Floethen Gassen. Since this machine is fully genuine and you may have demand for it, I contacted you. I want to sell this machine so if you have an interest on this machine, you can look at the pictures of the machine.

Sincerely

Sencer AYDIN

We have certainly had a look at Sencer’s photos and what a superb engine and still complete and in its place of work and what is more with the same family. It would be wonderfull if he was in a position to retain it.

How nice of him to think our National Steam Museum as a worthy place for it to reside. It just shows how our hard work is paying off in establishing an international reputation for ourselves.

A quick search of the internet revealed nothing about Gassen but it is obviously a portable engine with its wheels removed.