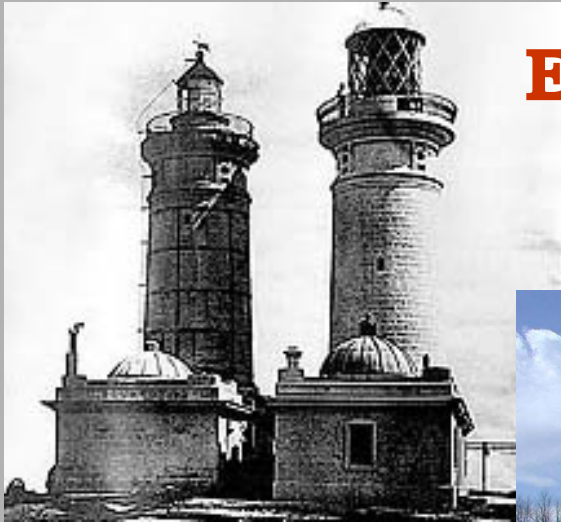


# ENGINEERING HERITAGE



## **Engineering Heritage**

**Engineering heritage can be adequately defined for our present purpose as heritage that is related to engineers or engineering; usually because engineers were significantly involved in its design, construction or operation. Engineering heritage items fall into two categories that are not mutually exclusive.**

**In one category, the heritage significance is primarily because the design, construction or use of materials and technology was unusual, innovative or represented a landmark in the development of engineering practice. In other words, for these items there is heritage significance in the engineering. In the examples that follow, there will be a few that fall into this category.**

**Most of the items of engineering heritage in New South Wales are in the second category. They derive their main significance not from their engineering as such, which might be quite ordinary. Their heritage significance is mainly historical or cultural and relates to the aspirations, development or the life a local community or of the state.**

**The presentation we will illustrate this by looking at a number of examples of engineering heritage from various places in NSW, mostly country areas. The examples have been chosen because they are representative of the kinds of things that heritage advisers come across identifying, assessing or helping to conserve. The selection presented is not fully comprehensive, and in particular it includes very few items of movable heritage.**

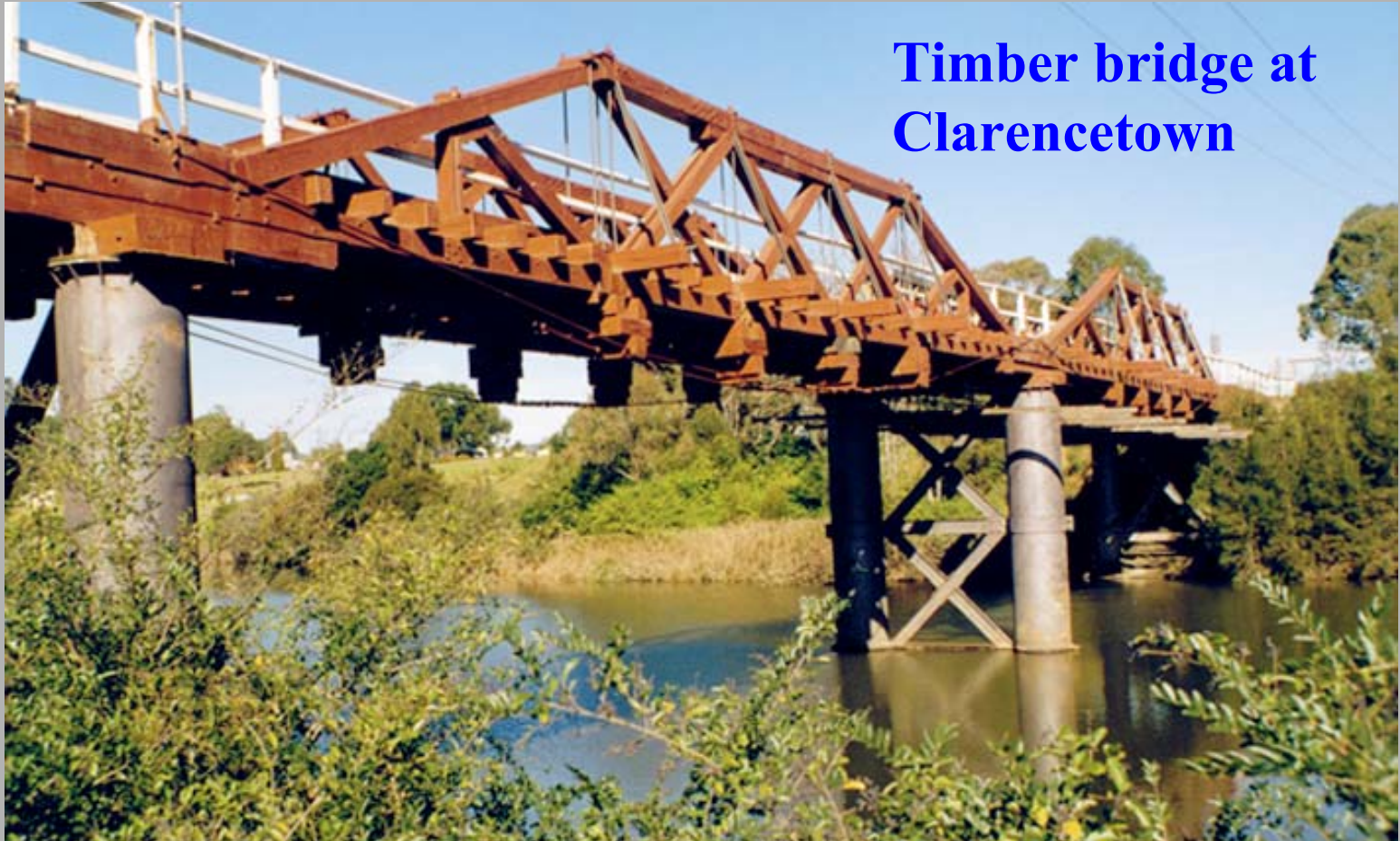
**It is sometimes easy, at other times difficult, to assess and conserve the significance of engineering heritage items. More often than not it is difficult, and sometimes expensive. This is best understood by looking at some examples.**



### **Denison Bridge, Bathurst**

The first Denison Bridge, a timber arch across the Macquarie River on the Sydney side of Bathurst, was opened in 1856. It was washed away in the flood of 1867. Gustavus Morrell, an engineer recently arrived from Europe, designed the Denison Bridge for the Public Works Department. It was built by the Sydney firm P. N. Russell and Company, and is said to be largely made from iron produced at the Fitzroy iron works in Mittagong.

The bridge was part of the Great Western Highway until 1993. It is now owned by the Bathurst City Council. It is listed in the State Heritage Inventory, and is awaiting gazettal for inclusion on the State Heritage Register.



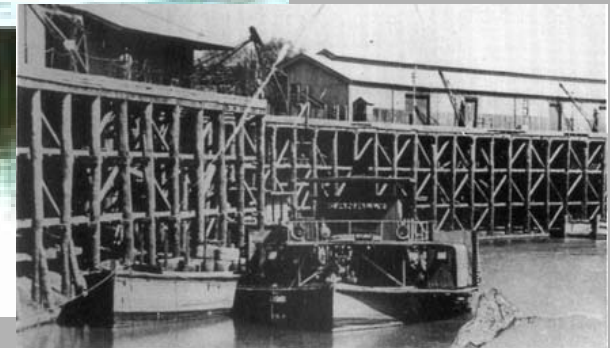
## Timber bridge at Clarencetown

### **Timber truss bridge at Clarencetown**

The bridge, opened in 1880, crosses the Williams River at Clarencetown, north of Newcastle. In the twenty years 1865 to 1885 over 100 similar bridges were built in New South Wales, but only two remain.

Timber truss bridges were a feature of New South Wales country roads, and around 400 were built between 1860 and 1936 by the Public Works Department to various standard designs developed within the department. They have been largely superseded by steel and concrete bridges and fewer than 100 remain. The Roads and Traffic Authority has a policy of retaining a group of representative examples.

This bridge is included in the State Heritage Register.



## Echuca wharf

### Echuca Wharf

Built in 1865 and connected with Melbourne by the railway that had reached Echuca a year earlier, the wharf became the main centre for the river trade, and for a brief period, Echuca was Victoria's second largest port. New South Wales was the source of most of its business. By 1870 there were over 100 ships and barges on the river system, and Echuca was handling an average of four ships per week. River navigation reached to Albury on the Murray, Gundagai on the Murrumbidgee and Walgett on the Darling. More than one-third of New South Wales wool went to the market by river steamer.

With the building of railways the river trade declined, and by the time a system of locks and weirs on the Murray, provided after Federation, had stabilised the flow and made reliable year-round navigation possible, it was virtually dead.

Although the Echuca wharf is on the Victorian bank of the Murray it is included in the New South Wales State Heritage Register.

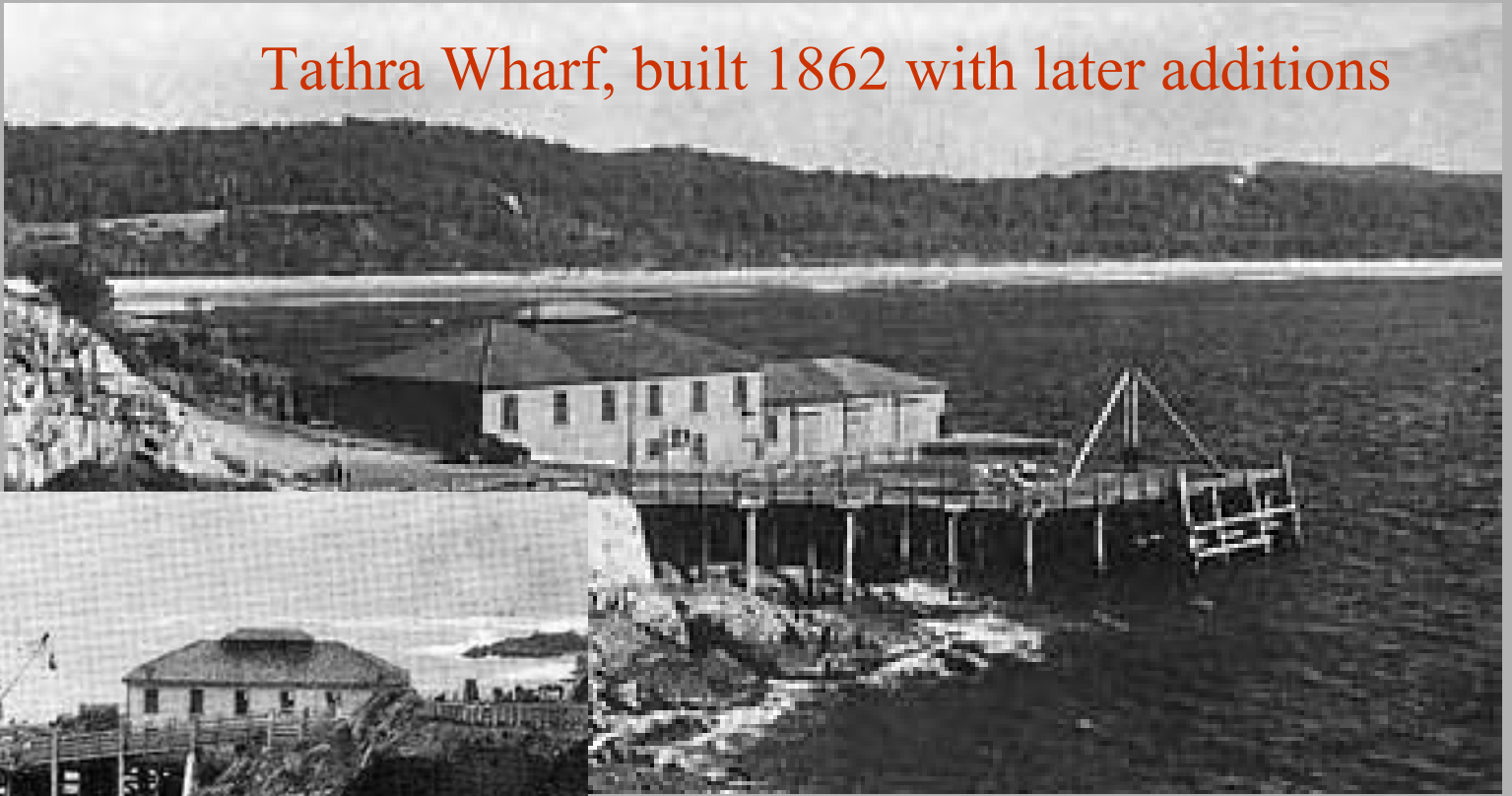


### **Wilcannia Wharf**

The picture shows the remains of the wharf at Wilcannia on the Darling river. In the 1880s it was the main reason for the town's existence. It is not listed in the State Heritage Inventory.

Wilcannia wharf

## Tathra Wharf, built 1862 with later additions



### **Tathra Wharf**

The wharf dates from 1861, but has been modified and added to over the years. The last ship to take freight from Tathra was in 1954, but the wharf continued to be used by local and fishing vessels. It was about to be demolished in 1977, but this was successfully resisted by the National Trust and the local community. It has since been restored with the help of government grants. It is included in the State Heritage Register.

# Macquarie lighthouses, South Head



## Macquarie Lighthouse, South Head

The first Macquarie lighthouse was built in 1818. It was replaced by the present one in 1883. The new lighthouse, like many others in the state, was designed by the Colonial Architect, James Barnet, who was also responsible for the innovative scheme for having it lit by electricity generated on the site by a gas engine. The gas engine and generator remain but are no longer in use.

There were a total of 25 lighthouses built during the colonial era in New South Wales. 20 are still standing, four have been replaced and one is a ruin. All are owned by the Commonwealth government. They still operate, though with the availability of global positioning systems they are no longer really needed for navigation.

The Macquarie Lighthouse is included in the State Heritage Register, as are four others. About half the rest are listed in the State Heritage Inventory.



## Remains of Gold Mining in NSW

This is just a selection from the many remains of mining activities in various parts of New South Wales. In almost every case these mining activities contributed to the establishment and growth of the neighbouring towns.

Often, as at Hill End and Adelong, the towns declined when mining ceased. In 1871, at the height of its mining activity, Hill End had a population of 30,000, and was probably the largest country town in New South Wales. By 1874 it was in decline. Left behind are a large number of mining relics, a few buildings, and a remarkable set of photographs by the American photographer Henry Beaufoy Merlin, forming part of the Holtermann collection now in the Mitchell Library.



Ropeway and roasting pits, Hill End

## Remains of Gold Mining in NSW



Cyanide tanks, Grenfell



Puddler, Adelong

The cyanide tanks at Grenfell date from the introduction of that technology for gold extraction in the 1890s.

The extensive remains at Adelong are included in the State Heritage Register. The remains at Grenfell and Hill end are not listed in the State Heritage Inventory. There are extensive remains of mining in various parts of the state. Many of them are reasonably well known to interested local people but few are included in the state Heritage Inventory.

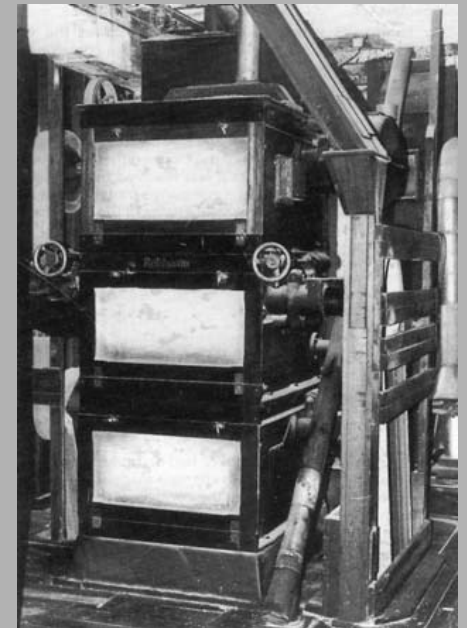
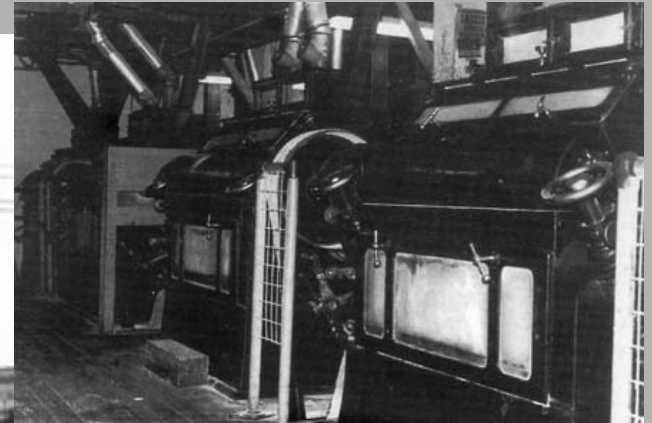
## Headlie Taylor header



### **Headlie Taylor Header**

Headlie Taylor grew up on a farm at Henty and developed an interest in mechanics. He built his first header harvester for the 1911-12 wheat harvest, and improved the design over several years. In 1916 he moved to Melbourne to supervise the production of these harvesters at the Sunshine Harvester Company. His innovations influenced the development of grain harvesting machinery world-wide. His harvesters were particularly suited to southern New South Wales because they could pick up and harvest a rain-damaged crop.

The header preserved at Henty was made from parts salvaged from nine different machines. The machine is in the custody of the shire council but is not listed in the State Heritage Inventory.



**Flour mill, Young**

# Flour mill, Young

## Young Roller Flour Mill

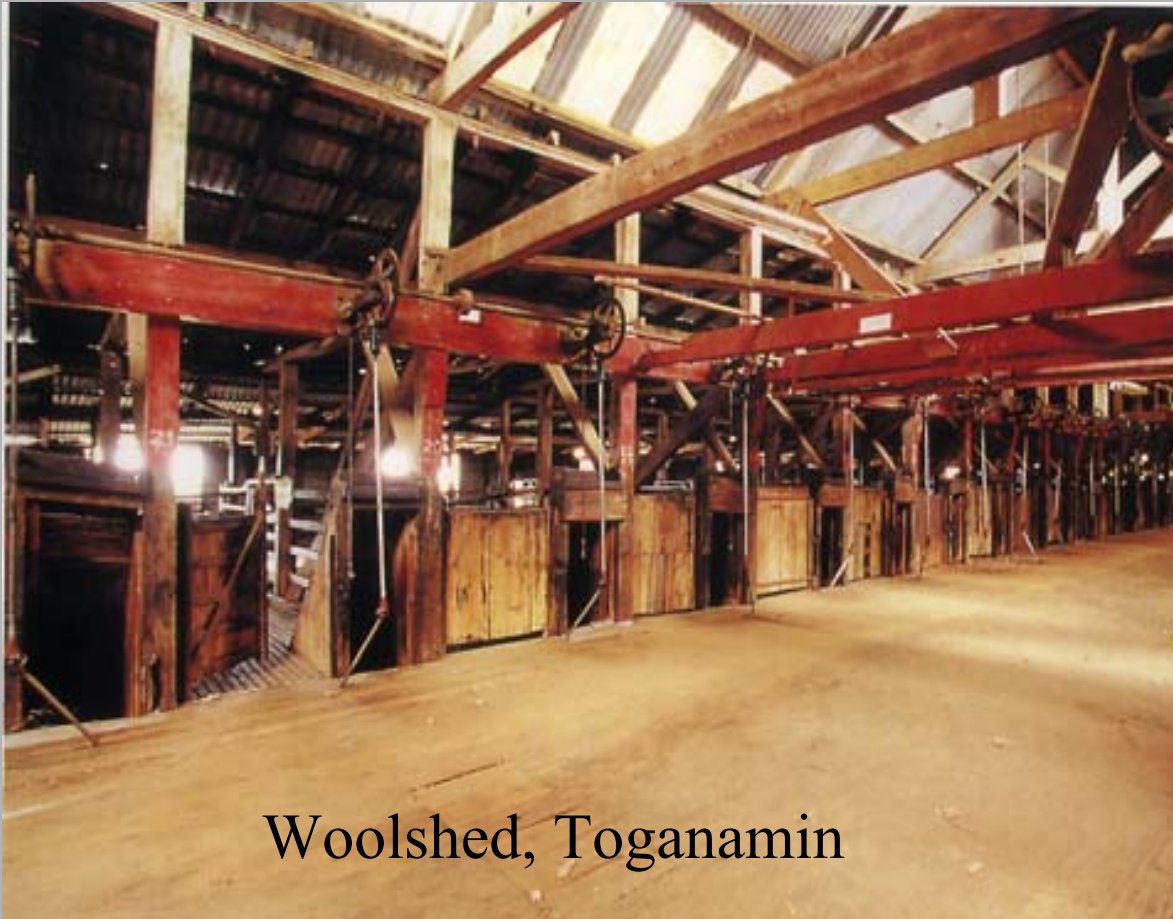
In the book *Industrial Archaeology in Australia*, by Birmingham, Jack and Jeans, published in 1983, is a picture of the flour mill, with the words ‘...it is the only colonial mill in New South Wales to retain in full working order all its late nineteenth-century machinery.’ In fact the mill has been progressively modernised over the years, and three years ago the last of the original equipment was removed.

It had been recognised that this mill was most unusual in having colonial-era machinery long after it had been scrapped elsewhere, and in 1981 the National Trust and the Powerhouse Museum recorded and photographed what was there.

Milling technology underwent a fundamental change in the 19<sup>th</sup> century with the replacement of millstones by rollers. The use of rollers was patented in France in 1823 and roller mills were installed in continental Europe in the following decades. But in 1877 there was still only one roller mill in Britain and none in Australia. In that year a party of forty English millers made a study tour to Vienna and Hungary. By the end of that year there were 350 roller mills in Britain. Roller milling came to Australia in 1879, with Hungarian equipment at the Union Mill at Gawler, South Australia. Roller mills, mostly with British equipment, became fairly common through the 1880s, although the one at Young was an early one in country New South Wales..

The Young Cooperative Roller Flour Milling Company was formed in 1890, and purchased the equipment for its mill from Thomas Robinson and Co. of Rochdale in England. The mill started operation in 1891. The original building is still in use and now houses modern milling machinery.

The mill building is listed in the State Heritage Inventory.



## Woolshed, Toganamin

### Toganmain woolshed

The woolshed is described by a correspondent to the *Town and Country Journal* in 1872 as being 200 feet long, 54 feet wide, beside two wings of 15 feet each. About 100 men were employed there during the season. It was one of the first sheds in the Riverina to use shearing machines, and The Wolseley Company demonstrated its shearing machine there in 1887. In 1888 there were 15 installed, and the shed was one of the first in the Riverina to be so equipped. Eventually there were 55 machine stands installed, of which only 21 are still used.

The woolshed is not included in the State Heritage Inventory.

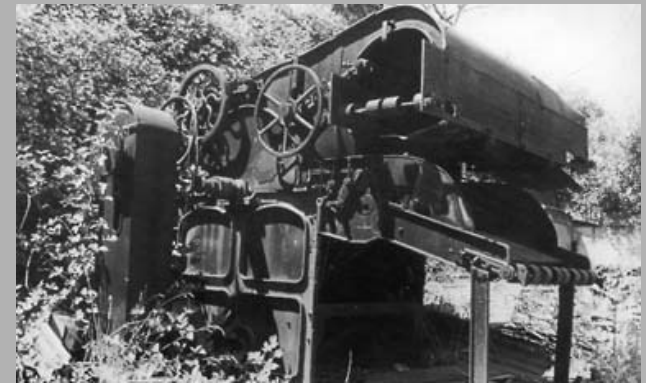
## Woollen mill, Coerwull



### **Coerwull woollen mill, Lithgow**

The mill at Coerwull, near Lithgow was once one of about eight substantial mills operating in New South Wales by the 1870s. Most of these closed before the end of the 19<sup>th</sup> century, but Coerwull continued to operate intermittently. It was badly fire-damaged in the 1960s and the last of its machinery was sold in 1977.

The ruins remain much as in the photograph. They are not in the State Heritage Inventory.



## Fitzroy Ironworks, Mittagong



Iron smelting on the site commenced in 1848, using local iron ore, limestone and charcoal. The works also made wrought iron in a forge. 50 small castings of a lion were made and distributed to commemorate Governor Fitzroy's visit in 1850. The one shown here is at the Mittagong Public Library; There is another at the shire offices in Moss Vale.

# Fitzroy Ironworks, Mittagong

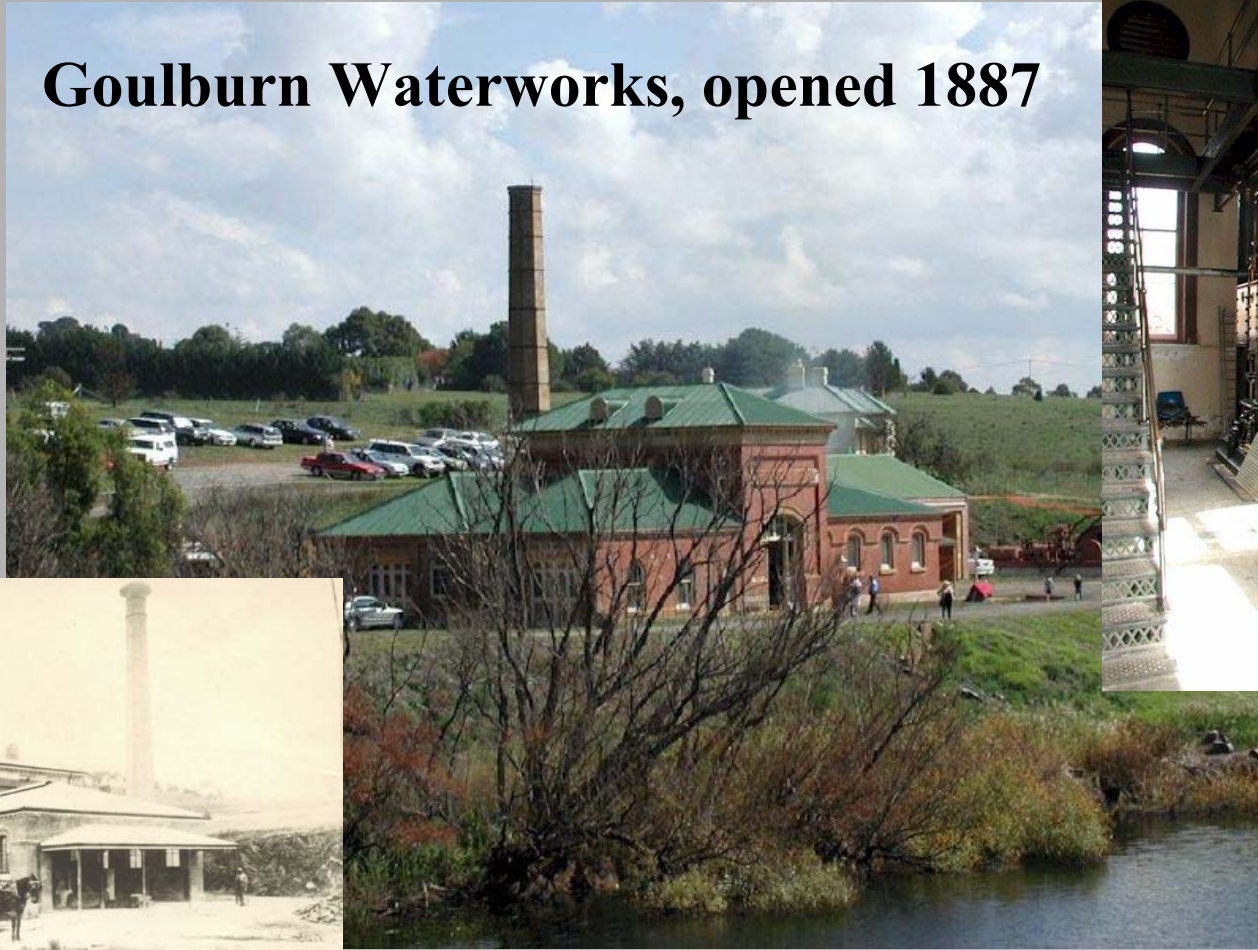
When the forging hammer broke in the early 1850s, iron making was discontinued. The next stage of development commenced in 1863 when a blast furnace was installed and coal was used as fuel. There were also five rolling mills installed to produce bars and sheet iron. There were continual problems with the plant and steady production of a saleable product was never achieved. The plant produced some of the cast iron piers for the Gundagai bridge in 1866, and is said to have produced much of the iron for the Denison bridge at Bathurst. The works closed in 1869, and the company was wound up and its assets sold. In 1873 a new company was formed and commenced to produce iron in 1876. Smelting ceased in 1877, but the mill continued to produce rails from the stock of iron on the site until 1879. Some of the rails were used at the neighbouring oil shale railway at Joadja. The rolling mills were restarted briefly in 1886.

In 1927 a local stonemason bought the remains of the blast furnace for £20 and demolished it for building stone. All that remains on the site are some foundations and drains carved from the rock.

None of the remains of iron-making at Mittagong is listed in the State Heritage Inventory.



# Goulburn Waterworks, opened 1887



## Goulburn Waterworks

The Marsden Weir and pumping station on the Wollondilly River between 1883 and 1886. It is the only one of four similar town water supply pumping stations built by the NSW Public Works Department in the early 1880s to have retained its original machinery. The buildings at the other locations, Bathurst, Albury and Wagga Wagga are still standing. The building contains the original Appleby steam engine and pump, still in working order, one of the few of this kind remaining anywhere in the world. This one at Goulburn was in regular use until 1932.

The Goulburn waterworks are included in the State Heritage Register, with specific mention of the engine as well as the building. The waterworks buildings at Bathurst and Albury are listed in the State Heritage Inventory.

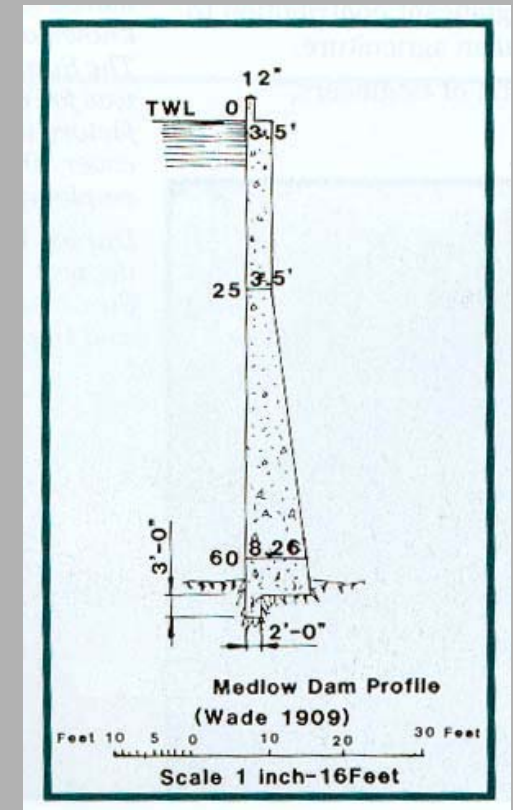


**Medlow Bath dam**

This dam is one of thirteen similar dams built between 1896 and 1908 to provide water to country towns. The innovative design was developed by the chief engineer of the Public Works Department, Cecil Darley, and was inspired by the building of the Bear Valley Dam in California. The dams are designed as concrete arches, without reinforcement. Medlow Bath dam is the most outstanding dam in the group, and at the time of its building in 1907 was the thinnest large dam in the world. When Darley presented a paper describing the design to the Institution of Civil Engineers in London, doubts were expressed about its safety. It is still in use by then Sydney Catchment Authority, and meets today's safety standards without any change to the original design or construction.

The Medlow Bath dam is included in the State Heritage Register. Most of the other twelve similar dams are still standing though not all are in service. None of them is listed in the State Heritage Inventory. The one at Wellington has recently been demolished.

## Medlow Bath Dam, built 1907



## Hay sewerage works



### Hay sewerage works

This sewerage works, in effect a large septic tank, was part of the scheme installed at Hay and commissioned in 1905. It was the first one in country New south Wales. At the time Hay had a population of around 3,000. The treatment works went out of service in 1954, and remained in a state of neglect until 1994, when the shire council with government financial assistance started a project to preserve the remains and provide interpretive signs.

The treatment works are listed in the State Heritage Inventory.

# Bathurst Gasworks



## Bathurst gasworks

These were the first municipal gas works in New South Wales, established in 1888.. They were added to and modernised over the years, but there are a few remains of the original works on the site. The gasworks no longer operate. They are not listed in the State Heritage Inventory.

These were not the first gasworks in Bathurst. Wark Brothers built a gasworks in Charlotte Street in 1872 and supplied shops, hotels streetlights and some houses. It continued to operate until it was bought out by the municipality in 1914.



# Hornsby Signal Box



## Hornsby Railway Signal Box

This signal box is no longer in service, but both the building and the equipment are intact, in close to original condition and in full working order. It is the only remaining example of its kind in Australia. There were until fairly recently several similar signalling installations around Sydney.

The signal box was built and fully equipped at the time of electrification in 1926. It operated continuously for seventy years. The design was basically American in origin but all of the equipment was designed and built by the Railways Signal Branch Workshops in Sydney. It's heritage significance is well recognised and it is likely to be retained intact, hopefully becoming the centrepiece of a railway signalling museum where its operation can be demonstrated by volunteers.

There are various other railway signalling installations around New South Wales, particularly in country areas that have been fairly recently or shortly will be taken out of service and which are of heritage significance. Some of them fall within the areas listed as railway station precincts in the State Heritage Inventory. The Hornsby signal box is not listed in the State Heritage Inventory.



## Warren telephone exchange

### Warren telephone exchange

The post office building housing the former Warren telephone exchange was built in the early nineteen twenties. It is now the tourist and information centre. The manual telephone exchange is the last installation of its kind to survive in Australia, although there are individual items of equipment preserved elsewhere. It is typical of country telephone exchanges throughout Australia that were in regular use until less than twenty years ago. The one at Warren was taken out of service in 1984 when the exchange became automatic.

Neither the building nor the telephone exchange is listed in the State Heritage Inventory.

