An end to isolation – the La Perouse Cable Station

John Walter Ross

Cover photograph:

La Perouse Museum (Museums and Galleries of New South Wales website).

“Well, Captain Pell, should you ever hear of the telegraph one of these days as the wonder of the world, remember the discovery was made on the good ship *Sully*”

Samuel Morse speaking on landing in the United States in 1832[1].

"No work of greater magnitude or of such vast importance as this knitting of our distant colonies with the rest of our great empire has ever been recorded as having been carried out by one colony without any outside aid whatever."

British Prime Minister William Gladstone acknowledging the achievement of completing the undersea cable from Java to Port Darwin in 1871 and the Overland Telegraph line in 1872[2].

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Foreword

Until the second half of the nineteenth century, the only communication between Britain and Australia was by ship, taking weeks or months to receive news, correspondence and Government directives in the colonies. But discoveries involving the generation and use of electricity opened the way to much faster communication via overhead wires and undersea cables. The American painter Samuel Morse was determined to find a way of communicating quickly over long distances after his wife died in 1825 while he was away from home, and he didn't learn about it for many days. A chance meeting on a ship when he was returning to America in 1832 provided the impetus to design the first electric telegraph system.

Morse and the English scientist Charles Wheatstone developed rival telegraph systems, but Morse's simpler single-wire system using a code of long and short electrical pulses became the standard for European telegraphy. By 1845, private companies in Britain and the United States and governments in Europe began to establish telegraph services. The idea of submarine lines linking the continents arose in the early days of telegraphy, and experiments with insulated cables started in 1842. The first successful Transatlantic cable was laid in 1866 by a British company, and in the next few decades Britain's vast colonial empire provided the business for newly-formed cable companies, especially from news agencies, trading companies and the British Government. Throughout the 1860s the British telegraph network expanded eastwards, eventually linking Australia's neighbours to London via Indonesia, Singapore and Bombay.

The first Australian telegraph line was opened in 1854 between Melbourne and the port of Williamstown to provide the city with early news of shipping arrivals. Within a few years, the network had expanded to Adelaide, Sydney and via submarine cable to Tasmania. There was strong pressure to establish a telegraph link to Europe, and in 1872 the Indonesian cable was extended to the Port of Darwin, coordinating with the epic construction of the Overland Telegraph line from Adelaide to Darwin. The result saw the linking of the Australian colonies with the rest of the world, a giant leap forward in the speed of communication with the mother country. News that previously took weeks now arrived on the same day. The electric telegraph had become the wonder of the age.

The final link in the communication chain was to connect New Zealand to the world via the Australian telegraph network. In 1875, the New Zealand and New South Wales Governments signed an agreement to lay an undersea cable from Nelson in the South Island to Sydney. The original cable landing site of Sydney town was deemed unsuitable due to shipping traffic and strong tides in the harbour, so the more isolated suburb of La Perouse was chosen. The cable was laid across the 1,370 nautical miles of the Tasman Sea the next year. A permanent Cable Station was constructed at the landing site in 1882, and was used until increased business led to the construction of a larger building at nearby Yarra Bay in 1903. The cable operated to La Perouse until 1917 when it was redirected to Bondi Beach and extended right into the cable office in Sydney, at which point the La Perouse cable station buildings were closed.

The 1882 Cable Station was soon put to use in 1919 to house patients of the great influenza pandemic, sent there from the nearby Coast Hospital at Little Bay. After the epidemic, the building was retained by the hospital to house nurses on night duty until the start of World War II, when it accommodated soldiers from a Coastal defence unit. In 1944, the Government leased the building to the Salvation Army to use as a women's and children's refuge, the first in Sydney. In the Bicentennial year of 1988, the building was converted to its present use as a museum dedicated to the

explorations of the French navigator La Perouse, who encountered the First Fleet at Botany Bay in January 1788.

European settlement from 1788 gradually forced the Aboriginal population of Sydney to outlying areas, including La Perouse. In 1896, the Dharawal people's claim to the land was partly recognised by the allocation of seven acres of land as the La Perouse Aboriginal Reserve. Yarra Bay House was built by the cable company in 1903 on part of this Reserve to cater for the increased business at the cable station. It was used until the cable was moved to Bondi Beach in 1917, after which it remained closed for ten years. The building was then used for a succession of child welfare institutions, from a training school for girls to a truant school and home for boys. In the 1960s, the La Perouse Aboriginal community campaigned to remain on the Reserve, then to gain control of the land, including Yarra Bay House. In 1984, the title deed for the land and house was handed over to the local Land Council, and the house has been used since then as a base for activities supporting the local community.

The history of the suburb of La Perouse since European settlement is one of isolation, and the institutions that have occupied it reflect this. The Cable Station was built there because it was far enough from Sydney, as were the Coast Hospital for infectious diseases and the Aboriginal Reserve. Later occupation of the two Cable Station buildings was largely the result of a desire to isolate the women and children in the care of welfare organisations from the stresses of the city. Other local structures such as the Macquarie Watchtower and the Bare Island Fort served to protect and defend Sydney's back door. The wide variety of uses for the two buildings over time illustrates the unique character of this part of Sydney.

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Timeline

- 1788: Arthur Phillip and the First Fleet encounter Laperouse at Botany Bay.
- c1822: The Macquarie Watchtower is built.
- 1844: Samuel Morse opens a telegraph line between Washington and Baltimore.
- 1851: The first successful submarine telegraph cable is laid across the English Channel.
- 1854: The first Australian telegraph line opens between Melbourne and Williamstown.
- 1862: John McDouall Stuart finds an all-weather route from South Australia to Darwin.
- 1865: The first successful Transatlantic telegraph cable was laid.
- 1872: The Java to Port Darwin undersea cable becomes fully operational.
- 1870-2: Charles Todd builds the Overland Telegraph Line on Stuart's route between Darwin and Adelaide, thus linking Australia to Britain.
- 1876: The telegraph cable is laid from La Perouse to Nelson, linking New Zealand to the outside world, and using temporary buildings and tents.
- 1881: The Coast Hospital is established at Little Bay during a smallpox epidemic.
- 1882: The permanent La Perouse Cable Station is completed.
- 1885: Bare Island Fort is constructed.
- 1885: The La Perouse Aboriginal Mission is founded.
- 1896: The La Perouse Aboriginal Reserve Seven is established on seven acres at Yarra Point.
- 1899: Part of the Reserve is sold to British telegraph company for a second cable station.
- 1903: Yarra Bay House is constructed and the telegraph service is transferred there. Staff quarters remain at the 1882 Cable Station.
- 1917: The cable landing site is moved to Bondi Beach, and the La Perouse telegraph operation is closed.
- 1918: A deadly influenza pandemic sweeps the world, killing some 20 million people.
- 1919: Influenza patients from the Coast Hospital are housed in the 1882 Cable Station.
- 1920: Night duty nurses from the Coast Hospital are accommodated in the 1882 Cable Station.
- 1928: The La Perouse Training School for Girls opens at Yarra Bay House as an annex of the Parramatta Industrial School.
- 1940: The Yarra Bay House Truant School for boys opens.
- 1944: The 1882 Cable Station becomes a Salvation Army refuge for women and children.
- Mid-1950s: The Yarra Bay House Truant school becomes the Yarra Bay Boys' Home.
- 1969: The La Perouse Aboriginal community campaign to remain on the Reserve. They then wage another campaign to gain control of the land.
- Mid-1980s: Yarra Bay House is used as a child care centre and a base for the Aboriginal Medical Service.
- 1984: The title deed for Yarra Bay House and surrounding land is handed over to the La Perouse Local Aboriginal Land Council.
- 1980s: Optical fibre technology replaces copper wire in undersea cables.
- 1988: The Laperouse Museum was opened in the 1882 Cable Station.

Electric telegraphy, the Wonder of the Age

Electricity

Electricity is a physical phenomenon associated with the flow of electric charge. The widely-known effects of electricity are lightning, static electricity, electromagnetic induction and electric current. But long before any knowledge of electricity existed, people knew about shocks from electric fish such as catfish and electric rays. Ancient Egyptian texts referred to finding them in the Nile River. Ancient cultures around the Mediterranean knew that certain objects such as rods of amber could be rubbed with fur to attract light objects such as feathers. But the ancient experimenters thought that this static electricity was the same as natural magnetism in minerals such as magnetite. The link between electricity and magnetism was not established until much later.

Scientists in the eighteenth century learned more about electricity. Benjamin Franklin (1706-1790) showed that lightning was electrical in nature by famously (and dangerously) flying a kite in a storm and watching sparks fly from a dampened key on the line to his hand. Luigi Galvani (1737-1798) discovered that electrical signals controlled the muscles in animals by moving the legs of dead frogs with an electric spark. Alessandro Volta (1745-1827) provided scientists with a more reliable source of electrical energy by the invention of the battery, made of alternating layers of zinc and copper. Electromagnetism, the link between the electric and magnetic phenomena, was shown by Hans Christian Orsted (1777-1851) and Andre-Marie Ampere (1775-1836) in 1819-1820.

But it was the invention of the electric motor by Michael Faraday (1791-1867) in 1821 that demonstrated for the first time that electricity could have practical uses, and was not just a scientific curiosity. Then in 1831 he discovered electromagnetic induction, in which a magnet moving through a coil generated an electric current in the coil. These were breakthrough discoveries in the industrial era, showing that electricity was not only useful for powering machinery, but it could be generated from a power source such as a coal-fired steam engine.

The electric telegraph

Horses, trains and ships

Until the nineteenth century, long-distance communication of messages was only possible either by horseback, or from 1830 when the first railway line was built (from Liverpool to Manchester), by train. Communication between continents was by ship. News and messages sent by road across country took days, and those sent across oceans took weeks or months.

Samuel Morse (1791-1872) was an American who spent much of his life as a highly respected painter living in New Haven, Connecticut. A tragic incident in 1825 set him on the path of exploring more rapid long distance communication. One day while he was in Washington DC painting a portrait, he received a letter from his father telling him his wife was convalescing from illness. But the next day, another letter arrived informing Morse of his wife's sudden death. He immediately travelled back the 300 miles to New Haven only to find that his wife had already been buried some days before. He determined to one day find a faster way to communicate news over long distances.

Then in 1832 while returning home from Europe on the ship *SS Sully*, he met Charles Thomas Jackson (1805-1880), who was very familiar with electromagnetism. Observing various experiments with Jackson's electromagnet, Morse came up with the idea of a single-wire telegraph, and by the end of the six-week voyage, had worked out the basic model for a telegraph system. Morse's hope for his invention were expressed by his words on landing:

> "Well, Captain Pell, should you ever hear of the telegraph one of these days as the wonder of the world, remember the discovery was made on the good ship *Sully*"[3]

Figure 1 Samuel Morse and his Recorder, 1857

More like black magic than science

Beginning in 1836, Samuel Morse collaborated with the American physicist Joseph Henry (1797-1878) and the American machinist and inventor Alfred Vail (1807-1859) to develop an electrical telegraph system. The system sent pulses of electric current along wires which controlled an electromagnet at the receiving end. A code was needed to transmit natural language using only these pulses and the silence between them, and Morse developed the forerunner to modern International Morse code.

Meanwhile in England in 1837, William Cooke (1806-1879) and Charles Wheatstone (1802-1875) were developing an electric telegraph that also used electromagnets in its receivers. Their system used pointing needles that rotated above alphabetic charts to indicate the letters being sent. In

1841, Cooke and Wheatstone built a telegraph that printed the letters from a wheel of typefaces struck by a hammer. This machine worked well, but they failed to find customers for their system, and only two were ever built. After a few years, their multiple-wire signalling method would be overtaken by Morse's cheaper single-wire system.

While the electric telegraph was being developed by Cooke and Wheatstone in Britain and Samuel Morse in America, many people thought that electromagnetism was more like black magic than science, and investment was slow in forthcoming on either side of the Atlantic. But after several years, Cooke and Wheatstone had managed to persuade some railway companies to use their system for signalling train movements.

Figure 2 Wheatstone's alphabetic telegraph indicator, 1858

It was not until 1844, when Morse successfully opened a telegraph line from Washington to Baltimore that the potential of the invention began to be realised[4]. The line was officially opened on 24 May 1844 when Morse sent the now-famous words "What hath God wrought" from the Supreme Court chamber in the US Capital building to the Mount Clare railway station in Baltimore[5].

One notable early use of the Cooke and Wheatstone system was to assist British police to capture the suspected murderer John Tawell in January 1845. After poisoning his mistress Sarah Hart with prussic acid in Slough, he was seen boarding a train bound for London. A telegraph message sent 30 kilometres to Paddington station alerting the staff of his imminent arrival with a description, after which he was followed by the police and arrested. Newspaper coverage of this incident gave a great deal of publicity to the new electric telegraph and brought it firmly into public view[6].

The Morse code

The American telegraph system was designed to make indentations on a paper tape when electric currents were received. In his earliest code, Morse planned to transmit only numerals and to use a code book to look up each word according to the number sent. However, the code was soon expanded by Alfred Vail to include letters and special characters, so it could be used more generally. Vail estimated the frequency of use of letters in the English language by counting the movable types he found in the type cases of his local newspaper in Morristown, New Jersey. The shorter marks were called dots and the longer marks dashes, and the most commonly-used letters were assigned the shorter groups of dots and dashes.

In the original Morse telegraphs, the receiver's armature made a clicking noise as it moved in and out of position to mark the paper tape. The telegraph operators soon learned that they could translate the clicks directly into dots and dashes and write these down by hand, making the paper tape unnecessary. When Morse code was later adapted to radio communication, dots and dashes were sent as short and long pulses. It was found that people became more proficient at receiving Morse code when it was taught as an aural language, rather than one read from a page.

Figure 3 Telegraph key and sounder, Siemens 1865-1916

Telecommunication takes off worldwide

In May 1845, the Magnetic Telegraph Company was formed to build telegraph lines from New York City to Philadelphia, Boston, Buffalo, New York and the Mississippi[7]. After this, governments in Europe began to establish public telegraph services, operated by newly-styled Posts and Telegraphs departments. But American and British governments were content to leave the development of telegraph services to private enterprise.

The Morse telegraphic apparatus was officially adopted as the standard for European telegraphy in 1851. Only the United Kingdom, with its extensive overseas empire, kept the needle telegraph system of Cooke and Wheatstone. The first Australian electric telegraph was demonstrated in Melbourne in June 1853, and in March 1854 the first electric telegraph line was opened for business between Melbourne and Williamstown[8].

The "Victorian internet" is built

Early submarine cable trials

After Cooke and Wheatstone's working telegraph was introduced in 1839, the idea of submarine lines linking the continents began to take hold. Samuel Morse declared his faith in the idea of a trans-Atlantic cable in 1840, and in 1842 he submerged a wire insulated with tarred hemp and India rubber in New York Harbour and telegraphed through it[9]. The following autumn, Wheatstone performed a similar experiment in Swansea Bay.

A critical necessity was a good insulator covering the wire to prevent the current leaking into the water. India rubber was not ideal because it became deformed when warm and brittle when cold. Although from the 1840s rubber could be made more durable by vulcanisation, a process using heat and an accelerant such as sulphur. Gutta percha is a latex product from Malaya that was superior to India rubber, as it could be melted by heat and readily applied to wire, maintaining a tough elasticity. It was introduced to Europe in 1842 by Dr. William Montgomerie, a medical officer in the Indian service, who saw its potential use in making knife handles and medical instruments. In 1849, a two-mile cable coated with gutta percha was submerged off the coast of Folkestone and tested successfully.

Commercial telegraph cables

In August 1850, the first line was laid across the English Channel. It was simply a copper wire coated with gutta percha, and was not a success. Then in September 1851, a protected core cable was laid by the Submarine Telegraph Company across the Channel. In 1853, further successful cables were laid linking Britain with Ireland (from Portpatrick in Scotland to Donaghadee in County Down), Belgium (Dover to Ostend) and the Netherlands, and to Denmark (Orford Ness in Suffolk to Scheveningen).

The first attempt at laying a cable across the Atlantic was promoted by the American businessman Cyrus West Field, who persuaded British industrialists to fund and lay one in 1858. But the technology of the day was not up to this project. It was plagued with problems, and was operational for only a month. Subsequent attempts in 1865 and 1866 using the world's largest steamship, the *SS Great Eastern*, used a more advanced technology and were successful.

The deepest oceans were largely a mystery to science at this time, and in the 1830s the British naturalist Edward Forbes surveyed ocean beds throughout the Atlantic and Mediterranean and declared that there was no life at all below 600 metres. This seemed a reasonable conclusion, as there was no light at that depth, therefore no plant life, and the water pressure was known to be extreme. So it was quite a surprise in 1860 when one of the first trans-Atlantic cables was hauled up for repairs from more than three kilometres down and found to be thickly encrusted with corals, clams and other living detritus[10].

British dominance and the All Red Line

From the 1850s to 1911, British submarine cable systems dominated the most important market, across the North Atlantic Ocean. In terms of supply, the British had entrepreneurs willing to put up the enormous amounts of capital necessary to build, lay and maintain these cables. In terms of demand, Britain's vast colonial empire provided business for the cable companies, from news agencies, trading and shipping companies and the British government. Most of the British colonies had significant populations of British settlers, making news of the colonies interesting to the public in Britain.

British officials thought that telegraph lines passing through non-British territory represented a security risk, as lines could be cut and messages intercepted during wartime. So they set about creating a worldwide network within the empire, which became known as the All Red Line. Britain's very first action after declaring war on Germany in 1914 was to have the cable ship *Alert* cut the five cables linking Germany with France, Spain and the Azores, and through them, North America. After that, Germany could only communicate by wireless, which was monitored by the British Navy from Whitehall in London.

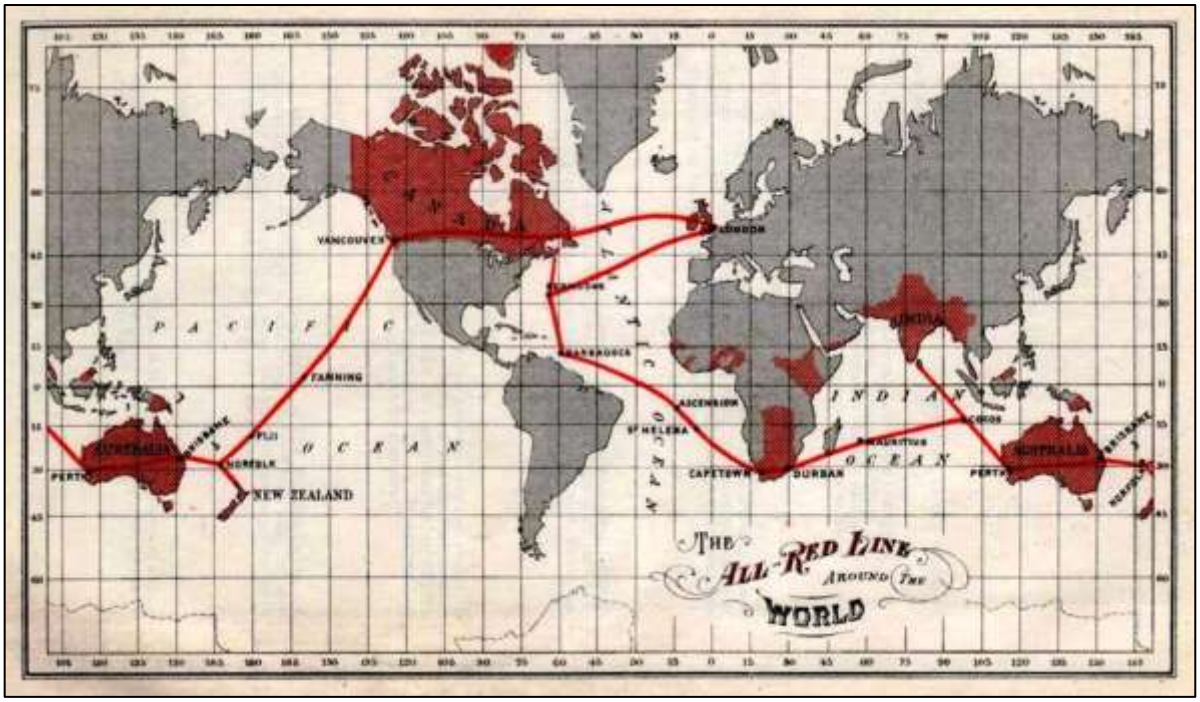


Figure 4 The All-Red Line

The submarine cables were a boon to trading companies, as owners could communicate with captains when they safely reached their destination overseas. The British government communicated administrative matters with governors of their distant colonies. An advantage Britain had across the Atlantic was the location of colonies in Ireland on the eastern side and Newfoundland on the western side, thus giving it the shortest route across the ocean, which reduced costs significantly.

British dominance of undersea communication is shown by a few facts. In 1896, 24 of the 30 cable laying ships in the world were owned by British companies. In 1892, British companies owned and operated two-thirds of the world's cables, and by 1923 their share was still 43%[11]. During World War I, Britain's telegraph communications were almost completely uninterrupted, while it quickly cut Germany's cables worldwide[12].

Eastern Extension to Australia

British cables expanded eastward throughout the 1860s and 1870s into the Mediterranean Sea and the Indian Ocean. In 1870, Bombay was linked to London via submarine cable in a combined operation by four cable companies at the behest of the British Government. In 1872 these companies merged to form the mammoth Eastern Telegraph Company, owned by the financier and telegraph pioneer John Pender. A spin-off of this company was a sister company, the Eastern Extension China and Australasia Telegraph Company (known as EETC).

In 1872, Australia was linked by cable to Bombay via Singapore and China. In 1902-3, the first trans-Pacific cables were completed, linking the United States mainland to Hawaii in 1902 and Guam to the Philippines in 1903. The trans-Pacific segment of the All Red Line in 1902 linked Canada, Australia, New Zealand and Fiji. In a 1998 book, the British science and technology writer Tom Standage referred to the worldwide system of telegraph lines as the "Victorian internet"[13].

Cable construction and early problems

Transatlantic cables of the nineteenth century consisted (from outer to inner layers) of iron and steel wire, wrapping India rubber, wrapping gutta percha, surrounding a multi-stranded copper wire at the core. The portions closest to each shore had additional protective armour wires. Gutta percha had almost ideal properties for insulating submarine cables, and was used until polyethylene was introduced in the 1930s.

Despite the effective protection from the deep-sea environment, early long distance submarine cables had formidable electrical problems. Unlike today, nineteenth century technology did not allow for inline repeater amplifiers to boost the electric current in the cable. Large voltages were used to try and overcome the voltage attenuation from the electrical resistance along their tremendous length. But the distributed capacitance and inductance of the cables combined to distort the telegraph pulses in the line, reducing the bandwidth and severely limiting the data transmission rate for telegraph operation to 10-12 words per minute.

As early as 1816, the British telegraph pioneer Francis Ronalds (1788-1873) observed that electric signals were retarded in an electric wire that was laid underground. Michael Faraday showed that the effect was caused by capacitance between the wire and the earth (or water) surrounding it. Early long distance cables failed to appreciate these effects. Edward Whitehouse, electrician for the Atlantic Telegraph Company, believed that a current could be driven through any cable, given enough voltage. But because of the excessive voltages recommended by Whitehouse, the first transatlantic cable never worked reliably, and eventually short-circuited to the ocean when Whitehouse increased the voltage beyond the cable design limit.

William Thomson (later known as Lord Kelvin) (1824-1907), Irish physicist and engineer, designed an electric field generator that minimised current by resonating the cable, and used a sensitive light-beam mirror galvanometer for detecting the faint telegraph signals at the receiving end. Apart from this, Thomson's main contribution to telegraphy was an accurate mathematical model of the cable, which permitted the design of equipment for accurate telegraphy.

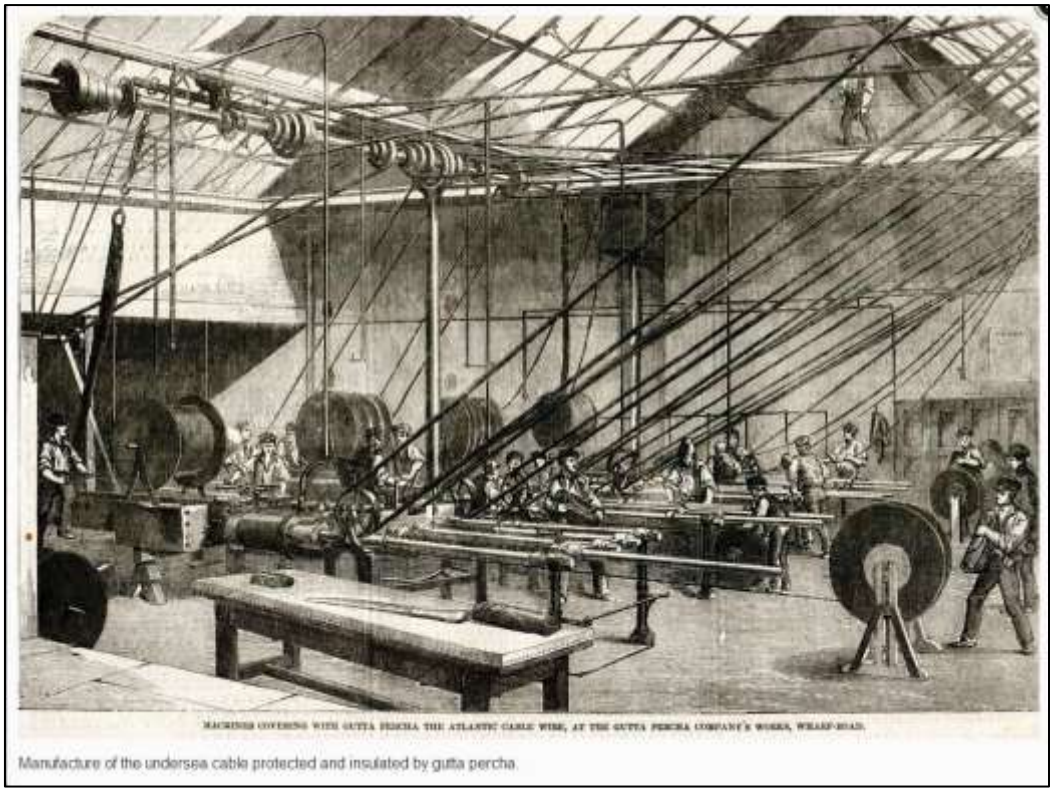


Figure 5 Transatlantic cable manufacture

Repairs to the cables were sometimes required, and samples of broken cables were kept at the Eastern Extension Company's head office in London. In some cases, chafing against sharp rocks had worn right through the outer canvas packing, the armoured sheathing, and the various protective layers within. In others, large fish had bitten right through them. In May 1804, the *Sydney Morning Herald* reported that

> "Sharks' teeth of enormous size have been found broken and embedded in cables. Despite all the trouble which mending it caused the repairers, probably no one was ever more sorry about the incident than the shark"[14].

The modern role of submarine cables

While the first submarine communication cables in the 1850s carried telegraphy traffic, subsequent generations of cables carried telephone traffic, then data communications traffic. The first transatlantic telephone cable opened in 1956 with 36 telephone channels. From the 1980s, optical fibre technology has been used to carry digital data, including telephone, internet and private data traffic. Modern cables are typically about 25mm in diameter and weigh around 1.4 kg per metre for the deep-sea sections which make up the majority of the run. Larger and heavier cables are used for shallow water sections nearer the shore.

As at 2006, overseas satellite links accounted for only one per cent of international traffic, the rest being carried by submarine cable. The cables are reliable, especially when multiple paths are available in the event of a cable break. The total carrying capacity of submarine cables is in the terabits per second, while satellites typically only offer one gigabit per second. However, a typical multi-terabit transoceanic submarine cable system costs several hundred million dollars to build[15].

Australia connects to the world

Samuel McGowan brings the telegraph to Victoria

1854 saw the foundation of the telegraphic network in Victoria and Australia. There had been pressure from business owners to improve communication between Melbourne and Port Phillip Heads, mainly for the passage of shipping information and news from Europe, as the Victorian coast was often the first landfall for ships sailing across the Southern Ocean. However, just as a decision was made to investigate the possibilities of the electric telegraph, a young Irish-Canadian engineer named Samuel McGowan (1829-1887) landed in Melbourne in 1853.

He had studied and worked in the United States with Samuel Morse, and worked with several Canadian and US telegraph companies. Encouraged by Morse, he decided to head for Australia in 1852 to try to establish the telegraph there. He brought with him an experienced telegraphist and a quantity of telegraph equipment. McGowan demonstrated his equipment in Melbourne, gaining enthusiastic support from the *Argus* newspaper. He won the contract to erect a telegraph line between Melbourne and the Williamstown docks, and the first electric telegraph line in Australia opened in March 1854, allowing shipping and other news to reach the capital quickly. By December 1854, the telegraph line to Geelong was completed. The first message sent to Melbourne gave news of the Eureka Stockade uprising in that month.

Inter-colonial expansion

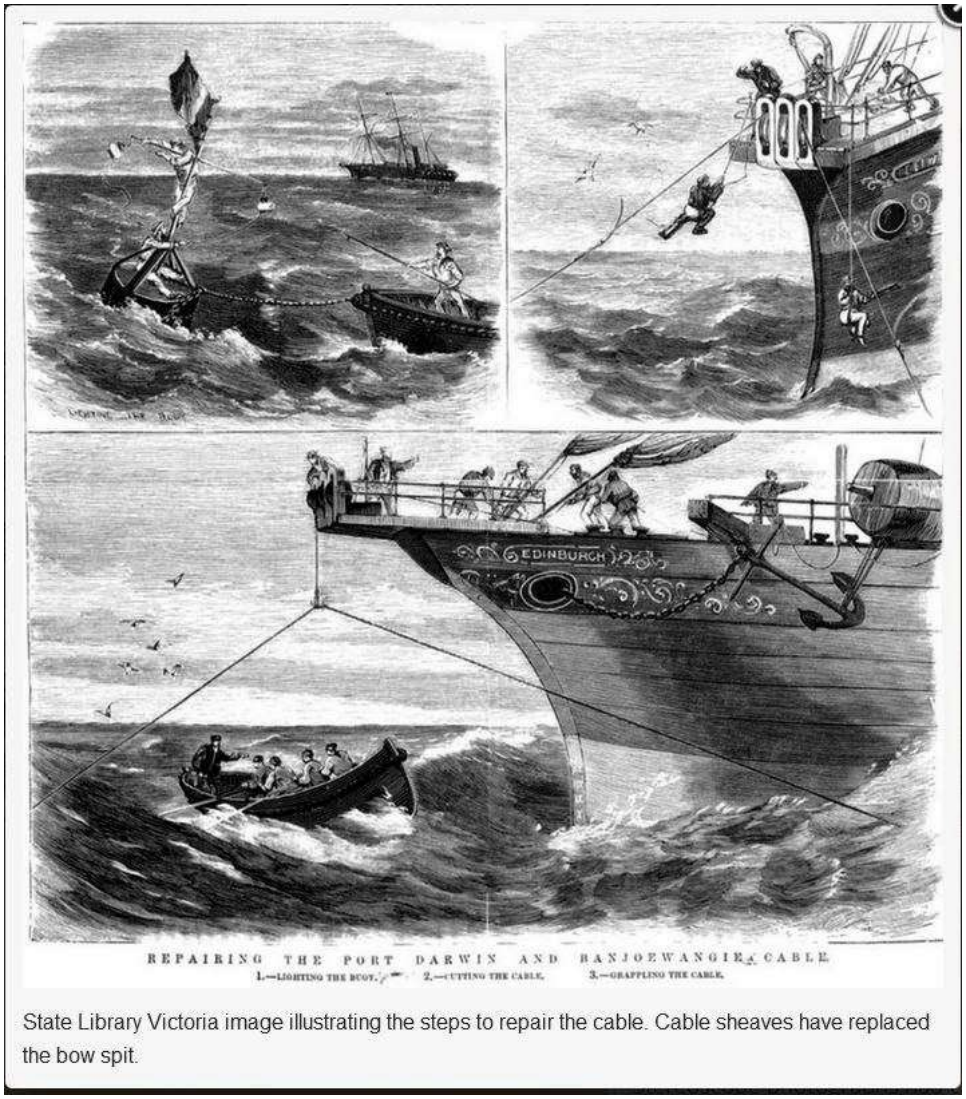
In July 1858, the inter-colonial telegraph line between Melbourne and Adelaide opened, followed in October 1858 by the Melbourne to Sydney line. European news arriving via ships calling at Adelaide could now reach Melbourne several days earlier than previously, and was quickly transmitted onwards to Sydney.

In August 1859, the first line from Victoria to Tasmania was laid between Cape Otway and Low Head, near Launceston. Melbourne and Hobart were then linked, uniting the four south-eastern Australian capitals. For a short time, the Bass Strait cable was the longest submarine telegraph cable in the world, although it only operated until 1861, and was replaced in 1869. In 1861, the telegraph line between Sydney and Brisbane was opened, and Adelaide and Sydney were directly linked in 1867[16].

The global telegraph network approaches Australia

From the opening of the first Australian telegraph line in 1854, there had been strong pressure to establish a telegraph link with Europe. By 1860, Sydney, Melbourne, Adelaide and Hobart were all connected by telegraph, but messages to and from Europe still relied on shipping, taking sixty to eighty days each way[17].

The telegraph lines from Europe were being extended eastward across the Mediterranean and the Middle East. But an attempt to extend the line to India via a submarine cable between Suez, Aden and Bombay in 1860 was unsuccessful when the cable failed repeatedly. An alternative route was found in 1864 and the line extended to India, Ceylon, Malaya, and Java in the East Indies[18]. The British Australia Telegraph Company decided to link the Java cable to Australia at the Port of Darwin, and by November 1871, the submarine cable had been laid.



State Library Victoria image illustrating the steps to repair the cable. Cable sheaves have replaced the bow spit.

Figure 6 Repairing the Java to Port Darwin cable

The race for an overland telegraph route

By 1860, the race was on to find a landing place and route through Australia, and a number of colonies were keen to secure the telegraph route for themselves. Victoria sent an ill-fated expedition, headed by the inexperienced Burke and Wills, to find a route from Broken Hill to the Gulf of Carpentaria in 1860-61. Queensland wanted the telegraph line to run from Darwin to Burketown in north-western Queensland and was exploring potential routes.

At around the same time, the South Australian government offered adventurers a £2,000 reward to map a route from South Australia to Darwin. In 1860, a Scot named John McDouall Stuart set out on his first attempt to cross the centre from south to north, racing against Burke and Wills. Unlike the hapless Burke and Wills, Stuart was a very experienced explorer who had accompanied Charles Sturt on his expedition to central Australia in 1844, and conducted numerous expeditions of his own, surveying extensively throughout South Australia.

His first two attempts at finding a north-south route failed due to a lack of supplies, dense bushland and confrontations with hostile indigenous people. But he was successful on his third attempt. Leaving Adelaide in December 1861, his party eventually reached the Timor Sea at Chambers Bay on 24 July 1862. He had travelled 2,900 kilometres, and unlike Burke and Wills who had reached the

Gulf of Carpentaria 16 months earlier, he made it back to Adelaide. He reported that timber was readily available most of the way, and he thought that his route could be made into almost a straight line for telegraphic purposes. But the trip had cost him his health, and he returned nearly blind and suffering from scurvy. He returned to Scotland where he died on 5 June 1866, aged 50.

Charles Todd builds the Overland Telegraph Line

Charles Todd (1826-1910) was an English astronomer with experience of the telegraph system when he was employed by the South Australian government, first as an astronomer and later as Superintendent of Telegraphs. Recognising the value of Stuart's achievement in finding an all-weather route through the middle of the continent, he was one of the main supporters of running a line from the Port of Darwin to Adelaide, where it would connect with the existing inter-colonial telegraph network. Todd convinced the South Australian Government to build a line from Port Augusta to Darwin, independently of the various negotiations that were going on with the other colonies, the British & Australian Cable Company and the British Government.

Figure 7 Overland Telegraph relay stations

Work commenced in August 1870 with Todd given just 18 months to complete the line. But the logistics were almost overwhelming. He worked out that the only way to complete the project in time was to divide it into three sections – southern, central and northern, and to work on them simultaneously. The harsh conditions of the arid centre and the tropical north made the construction of the Overland Telegraph line an epic achievement. Almost 3,000 kilometres of galvanised telegraph wire was provided, and over thirty thousand poles. Iron poles from England were used when local timber was not available.

Figure 8 First telegraph pole, Palmerston, Darwin, 1870

Figure 9 Cable station, Port Darwin

The poles were placed 80 metres apart, and eleven repeater stations had to be built every 200 to 290 kilometres, due to the weakening of the electrical current over that distance. Their role was to receive and retransmit messages to the next station along the line as well as maintain their section of the line. As there was no mains electricity, each station had its own power supply, a set of glass batteries called Meidinger cells. These batteries required constant maintenance, and repairs to the line were almost continuous, due to damage to poles and lines from termites, bad weather and

bushfire. The local indigenous people also found the wire was useful for making fishing hooks and the insulators for sharpening tools and weapons.

The undersea cable from Java arrived in Port Darwin in November 1871, to much fanfare. The Overland Telegraph line was scheduled to be finished in January 1872, but the project ran behind schedule due to the formidable difficulties with weather and terrain. However, the undersea cable failed in June 1872, and was not restored until October 1872. The cable failure took some pressure off Charles Todd, and the Overland Telegraph line was finally completed two months before this in August 1872. Todd sent the first official message from Darwin to Adelaide and the southern city celebrated the great achievement. Operators in Australia could then communicate with the world via Morse code 24 hours a day.

As land along the telegraph line was eventually settled, permanent townships grew up around some of the repeater stations, such as Alice Springs, Katherine, Daly Waters and Tennant Creek. As the names indicate, the availability of water in the dry outback determined the location of the stations as much as the weakening of the signal. Alice Springs was named after Charles Todd's wife, and the river through the town was named the Todd River[19].

Figure 10 Alice Springs telegraph station

In 1942, the bombing of Darwin was communicated to the rest of the country via the Overland Telegraph. But the invasion of Australia was anticipated, so the decision was made to cut the undersea cable. This was never repaired after the war, as new technologies such as radio and airmail had made the telegraph redundant. Even so, the overland line remained in use within Australia until the 1970s, when it was finally replaced by microwave links[20].

Fast but very expensive

The telegraph link with Europe eventually resulted in significant economic benefits for the Australian colonies. The rapid exchange of commercial information allowed better coordination of the supply and demand for agricultural produce, manufactured goods and raw materials. The ability of overseas companies to keep track of changing conditions in Australia encouraged investment and speculation in mining and other ventures.

But one of the greatest benefits of the new telegraph line was the rapid arrival of news. Articles could now arrive within hours of being written in Europe, rather than weeks or months by sea. Anticipating that the initial cost of sending messages from Europe would be very high, the Melbourne *Argus* and the *Sydney Morning Herald* formed Associated Press and entered into an agreement with Reuters to transmit news items to Australia.

These items would then be made available to other Australian newspapers on a subscription basis. Following hard lobbying from Associated Press for some form of legal protection of their investment, in 1871 the Victorian Parliament passed the first copyright legislation in the world to protect electronically transmitted news material. Copyright applied for a period of 24 hours from first publication by Associated Press or one of its subscribers. The legislation lapsed after 18 months, but it is significant in being an early attempt to legislate to cover copyright in the electronic media, an issue still under discussion today[21].

The end of isolation for New Zealand

The telegraph system in New Zealand

Captain William Hobson, the Lieutenant-Governor of New Zealand, opened the first official post office in the colony in 1840 at the first permanent European settlement at Kororakera (now known as Russell) in the Bay of Islands, in the far north of the North Island. The first telegraph line was opened in 1862, running from the port of Lyttelton to Christchurch. The selection was made partly because of the gold discoveries in the 1860s in the South Island bringing increased business. It was also difficult to construct telegraph lines on the North Island because of the aggression of the Maoris there. The next seven telegraph offices opened were all in the South Island.

On 26 August 1865, a cable linking the two main islands was successfully laid between Lyall Bay in Wellington and White's Bay near Blenheim, on the second attempt. The first telegraph office could then be opened in the North Island, and offices linked to the South Island cable connection were opened at Picton in 1865. In 1873, the station, its equipment and personnel were moved from White's Bay to Blenheim because of the harsh conditions at White's Bay. In 1872, the telegraph link between Auckland and Christchurch was completed. After this, local lines proliferated in New Zealand with every place of the slightest importance in both islands being placed in communication with the seat of government[22].

Figure 11 New Zealand telegraph network in 1868

Settlers in New Zealand still had very strong ties to Great Britain. Letters and newspapers from the home country were eagerly awaited, and events in Britain and Europe were followed with intense interest. Three ships which arrived in Wellington in the second half of 1840 after a five-month journey brought to the settlers an amazing 710 letters and 436 newspapers.

With the advent of steamships by the mid-1860s, mail services via the Suez Isthmus and with the cooperation of the Australian colonies had reduced the time to about two months. Mail and passengers were transferred from the Mediterranean to the Red Sea on a British-built railway from Alexandria to Suez. Britain saw this as the best way to guarantee fast passage to India and its other colonies in Asia and the Pacific.

Planning to connect to the world

From as early as 1860, New Zealand and the various Australian colonial governments were deluged with cable-laying propositions from British, European, Australian and Java-based businessmen. The proposals were for connections from Singapore or Java to Australia, and between Australia to New Zealand. In the end, the first undersea cable laid ran from Banjoewangie on the eastern tip of Java to Port Darwin in Australia in 1872.

This created a continuous route from Adelaide to London with a mixture of overland telegraph and undersea cables. The cables were all operated by the British & Australian Cable Company or its associated company, the Eastern Telegraph Company (of which the EETC was a subsidiary). Australia was then within 24 hours' direct communication with London. This sped up the transmission of short messages to New Zealand. Cable messages were sent to Adelaide, then on to Sydney or Melbourne, and finally carried as mail on ships to New Zealand[23]. At the Intercolonial Conference in 1872, the colonies of New South Wales and New Zealand agreed in principle to the construction of an undersea cable between Australia and New Zealand[24].

In June 1875, New Zealand Premier Sir Julius Vogel (premier from 1873 to 1875 and again in 1876), signed a contract with EETC, together with Sir Daniel Cooper (representing the New South Wales Government) to lay a cable from New South Wales to New Zealand by the end of April 1876. In July, EETC had signed another contract, with the Telegraph Construction and Maintenance Company, known as Telcon, for the manufacture and laying of the cable. Telcon was probably the leading British undersea cable construction company, having been in the business for more than a decade. It had a high success rate in cable-laying, including the transatlantic cable in 1866.

Schroder's Mistake becomes Cable Bay

One of the key decisions was the location of the New Zealand end of the cable, to be made by the New Zealand Government and agreed by EETC. The South Island's population was still greater than the North Island's and the Cook Strait cable was proving unreliable, with repeated and often prolonged periods when it failed to work. A South Island terminus was essential. The town of Nelson had a population of about 5,000 at the time, the fifth largest in New Zealand. A point close to Nelson had to be found.

The New Zealand Telegraph Department asked the Nelson Harbourmaster Captain James Cross to find the best location for the cable terminus as close as possible to Nelson. He recommended the little inlet known as Schroder's Mistake. Sheltered by Pepin Island, the inlet was only 17 kilometres up the Tasman Bay coast, north-east of Nelson. The great advantage was that there was reasonably deep water right up to the shore and causeway, whereas the water around Nelson was mostly shallow with large areas of mudflats enclosed by a boulder bank. Following this decision, it was felt

that Schroder's Mistake was not a fitting name to be part of the new venture, so the inlet was soon renamed to Cable Bay.

Another mistake creates the La Perouse terminus

Both colonial governments had agreed to provide accommodation, office space and other facilities for EETC staff. But these conditions, numbers 7 and 8 in the agreement, provided the New South Wales government with much difficulty during the next two years. Condition 7 stated that the New Zealand government would provide a telegraph line from the cable terminus for transmission of messages around New Zealand. Similarly, the New South Wales government was to provide a line to the Sydney Telegraph Office, along with all staff, apparatus, instruments and materials necessary for sending messages from the cable throughout New South Wales. Condition 8 stated that until the subsidy ceased to be payable, or for ten years afterwards, the two governments shall provide accommodation at the terminal points which the Company will use for sending messages through the cable[25].

When the agreement was signed in London in June 1875, the assumption by those present was that the cable would be taken into Port Jackson (now Sydney Harbour) and so directly into the Sydney Telegraph office in the city. However, close examination of local conditions showed that Port Jackson was very unsuitable due to the high risks associated with shipping, dredging, currents and the ocean floor. The New South Wales Government and EETC then decided to terminate the Sydney end of the cable on the northern shore of Botany Bay at La Perouse.

The necessity of changing the terminating point of the cable caused all the subsequent difficulties. Firstly, submarine cable could not be directly connected to the land line or telegraph wires, as their electrical properties and equipment were totally different. Had the terminating point been in Port Jackson, it would have been possible to actually run the cable into the Sydney Telegraph Office, so overcoming the difficulty and fulfilling clauses 7 and 8. However, at La Perouse this was not possible. The cable had to be terminated at a cable station there, messages received and then retransmitted over land line to the Sydney Telegraph Office. But EETC could not construct their own land line, as this would have contravened the *Electric Telegraph Act*.

Because the agreement was signed in London without first-hand knowledge of the feasibility of landing a cable at Port Jackson, confusion reigned for a couple of years between the various New South Wales Government departments about funding for the accommodation required for the EETC staff to operate the cable telegraph link, and whether the Government was even obliged to provide facilities at La Perouse. The complication of transmission of cable messages over a land line to the Sydney Telegraph Office had not been catered for in the contract. This explained why the facilities provided in La Perouse in 1876 were very temporary (wooden huts and tents), and caused W. G. Taylor, the manager of this section of EETC, to repeatedly complain about the poor standard of facilities.

The total cost of cable manufacture and laying, borne by EETC, was £290,000. The only cost to the colonial governments were annual subsidies of £5,000 by New Zealand and £2,500 by New South Wales, intended to reduce the rates for using the cable[26].

The cable is prepared

Two cable-laying ships were needed for the venture. They would be the same two Telcon-owned ships that had laid the Java to Port Darwin cable in 1872: the 3,200-ton *Hibernia* and the smaller 2,300-ton *Edinburgh*. The Trans-Tasman cable was similar to that laid in 1872. Although its core remained the same for the entire length, different weights were needed for laying in different

depths of water. The total length of the line will be 1,370 nautical miles. The cable will be of the following types and sizes, measuring from La Perouse to Cable Bay, New Zealand:

Type A – Shore end,	5 nautical miles
Type B – Intermediate	15 "
Type D – Second Intermediate	148 "
Type C – Deep sea	1,001 "
Type D – Second intermediate	152 "
Type B – Intermediate	44 "
Type A – Shore end	5 "

The weight of type A is 12 tons/mile, Type B 4 tons/mile, Type D 2 tons/mile, Type C 1.25 tons/mile[27]. Manufacture of the cable began at Telcon's London works in August 1875. By the end of September 1875, about 300 miles of the total length of about 1,850 miles had been made, wound onto three cable tanks on the *Edinburgh* (which was berthed at Telcon's wharf at East Greenwich), tested and found to be working perfectly. The 37 cable-laying and supervising engineers began to assemble.

Figure 12 Telegraph cable

In early November, under Captain H. Manning the *Edinburgh* sailed from London with some of the Telcon staff on board, first for Adelaide, which was effectively EETC's southern terminus and home to its recruitment and training station, then on to Sydney. Taking the rest of the cable, the larger *Hibernia* sailed eight days later direct for Sydney via the Cape of Good Hope, under Captain W. R. Cato. On board were Mr. C. R. Lucas, the engineer-in-chief of the enterprise, and the rest of the staff. The *Edinburgh* arrived in Sydney on 8 January 1876 and anchored in Neutral Bay in Port Jackson.

Several days later, EETC's new Sydney Superintendent Mr. W. Grigor Taylor, examined the proposed site of the landing place, cable house and company station. This was a sandy beach on the north shore of Botany Bay, well protected by rocks from the surf on the outer coastline. It was near the monument to the great eighteenth century French naval explorer Jean-Francois de Laperouse, whose ships *Boussole* and *Astrolabe* arrived in Botany Bay in January 1788 just six days after Captain

Arthur Phillip arrived with the First Fleet of convict transports and naval ships. Six weeks later, the *Boussole* and *Astrolabe* left Botany Bay and headed out into the Pacific, never to be seen again.

On 28 January 1876, the *Hibernia* arrived and also berthed in Neutral Bay. There the whole cable wound in the tanks of the two ships was tested and found to be in excellent condition with no sign of deterioration. By early February 1876, all was ready at La Perouse. The cable house (the little building into which the cable would come) and a temporary accommodation hut had been built, and three tents were erected to assist in the housing of cable-laying engineers and technicians[28].

New Zealand builds the land line

Meanwhile at the New Zealand end, the south-western end of the bay called Schroder's Mistake had been chosen as the landing site for the cable by Mr. J. S. Shapley (EETC's Superintendent for the company's New Zealand station), Captain Cross and the New Zealand Telegraph Department Surveyor Mr. Maling. This was the closest point to the area of flat and gently rising land where the offices and staff houses would be built. Mr. Shapley arranged for the building of the same initial facilities as at La Perouse – two temporary houses and tents.

Work then began on the great task of erecting the 24 kilometres of telegraph poles and land line from the Nelson Telegraph Office, using a gang of 40 men. Utilising specially cut poles brought from Wellington, the line first skirted the mudflats north of the town, then it went inland to Happy Valley and to the present settlement of Hira. Then it turned down the Wakapuaka River valley towards Delaware Bay. Five kilometres was through heavy bush, cleared to a width of 40 metres to take both the poles and an access track. The final section was across a rough hillside to the land where the station was to be built.

Laying the great cable

February was chosen for the laying of the undersea cable because it was the time of year with the most consistently warm and calm weather. On the afternoon of 4 February 1876, the *Hibernia* and the *Edinburgh* left their mooring in Neutral Bay and steamed around Sydney Heads to Botany Bay to be ready for an early start the next morning. On board the *Hibernia* was Australia's most knowledgeable man in the field of telegraphs and undersea cables – Edward Cracknell, Superintendent of Telegraphs in New South Wales since 1859. He had travelled from Britain to South Australia as a young telegraph operator in 1855.

The process began at 4 o'clock the next morning. The shore-end of the cable was to be laid from the *Hibernia*, so she had to be a short distance offshore, pointing directly away from the cable house and clear of all rocks. After assistance from a tug, she was in position. The *Edinburgh*, standing nearby, launched eight of her rowboats, lining them up between the *Hibernia* and the landing point on the shore. The cable was paid out with the *Edinburgh's* boats taking it ashore. By 7:20am the job was completed, and the cable was buried in a 1.5 metre trench from the shore to the cable house.

Figure 13 Laying the cable at La Perouse, 5 February 1876

At 9am, with all boats back on the *Edinburgh*, both cable ships set out for New Zealand with the *Hibernia* initially making 15 kilometres per hour, steadily paying out cable. Telegraphic contact was maintained with La Perouse through the cable for the entire voyage to New Zealand. Before nightfall, they had reached the end of the Australian continental shelf and the sea floor rapidly deepened to about 4,200 metres. Weather continued fine and calm for the next three days. The *Edinburgh* went ahead and took soundings while the *Hibernia* continued paying out cable. The deepest water at 5,200 metres was reached on Monday 7 February.

Early on the morning of 9 February, the cable in the fore tank was close to running out and a splice to the cable in the main tank was required. The cable joiners accomplished this quickly and the ship only needed to stop for ten minutes. By noon on the same day, the *Hibernia* was slightly more than halfway across the Tasman Sea, the deepest water had been passed and the sea floor was rising. But the weather was deteriorating – a fresh wind from the nor-nor-west was producing rising seas and the ship was rolling. She had to slow down and pay out the cable more slowly. Only the next morning did the wind begin to moderate.

Early that evening, the second splice had to be made, this time to a different weight of cable stored in the rear tank. This occurred about 500 kilometres due west of Cape Egmont. A fresh wind was still blowing in the early morning of Saturday 12 February. This would be a critical day, as the *Hibernia*'s cable was due to run out and the transfer to the cable stored in the *Edinburgh* was to be made. At about 4pm, crews on both ships sealed their cable ends, attached buoys and put them overboard. But the seas were still too high for the *Hibernia* to pick up the *Edinburgh*'s buoy.

By Sunday morning 13 February, the seas had gone down considerably, but still not enough. It was decided that both ships would move to the shelter of Tasman Bay or Golden Bay and transfer the technical staff to the *Edinburgh*. By Monday 14 February, the weather was calm enough for the transfer of staff to take place in Golden Bay, and in the afternoon they set out back to the buoys.

Approaching the New Zealand coast

The Nelson Harbourmaster Captain Cross would act as pilot for the cable ships' approach to Cable Bay. Meanwhile, the splice of cables had occurred and both ships set out for Tasman Bay, the *Edinburgh* now doing the paying out of cable and the *Hibernia* doing the sounding. By early evening, they had moved to much shallower water at only 270 metres depth, and the sea bottom had changed to mud.

At daylight on Wednesday 16 February, crews on both ships sighted land again. As Captain Cross had not yet arrived on the *Lady Barkly* or the *Tui*, the expedition's leaders and ships' captains decided to buoy the cable and run the ships into Nelson. There they would learn where the cable house was located in the bay and what preparations had been made for landing the shore-end of the cable, which then had to be run out to sea for about 70 kilometres. By then there was strong wind and broken seas.

The residents of Nelson were very surprised to see two very large ships steaming down Tasman Bay from the direction of Wakapuaka, as they were not expected until the next day. The ships were by far the largest the town had even seen, and completely dwarfed the barques and steamships regularly seen in Nelson (and elsewhere in the country), the largest of which was 490 tons.

Eventually, Captain Cross came back to Nelson and the cable ships were ready to set out on the final stage of the enterprise, laying the shore-end and paying it out to be spliced with the main cable buoyed off Farewell Spit. The expedition set about a similar exercise to that at La Perouse twelve days earlier. But this time, the cable came from the *Edinburgh*.

The final stage of the cable

Anchoring about a kilometre offshore, ten boats were lowered. One set off for the shore with a heavy rope from the *Edinburgh* to which the other boats were to tie up. The rope was difficult to land, but a strong swimmer named Hemi Matenga walked into the sea up to his neck and pulled it ashore. Meanwhile on land, the last 51 telegraph posts had been put up that morning and communication with Nelson had been established.

With the *Edinburgh*'s boats in position, the cable was gradually paid out and hauled ashore under the water from boat to boat. As it came closer to shore, eager helpers (including the men who had been building the land line) joined with men from the expedition in dragging it out of the sea, up the bank and to the cable house. Early on Friday 18 February, the expedition sailed for the buoy that had been left near Farewell Spit. In a choppy sea, the final splice was made at 1:15pm, and the cable was complete. New Zealand was then in telegraphic communication with Australia and the rest of the world. Returning to Schroder's Mistake, two of the engineers were landed on Saturday 19 February and undertook tests on the cable, finding that all was well.

Telegraph connection is established

The first business was a raft of congratulatory telegrams, beginning with Premier Sir Julius Vogel's cable of 19 February 1876 to the Earl of Carnarvon, British Colonial Secretary. The cable was opened for public business on the morning of Monday 21 February. On that day, 54 inward telegrams were received and 93 sent. By the next day, direct cable news was appearing in New Zealand newspapers. As was the case when cables were first received into Australia, the items were short.

Figure 14 Cable Bay, New Zealand, c1900

The first cable received from London was published in the *Nelson Evening Mail*:

> CABLE NEWS
> (REUTER'S SPECIAL CABLEGRAMS)
> LONDON February 19
>
> The Merchant Shipping Bill passed its second reading in the House of Commons. The Premier in answer to a question said the choice of title was the prerogative of the Queen. Mr. Lowe and Mr. Foster objected to the adoption of the despotic title of Empress.
>
> The wool market is active, and competition continues, but Australian sorts generally are a shade under last February rates. Faulty and crossbreds show a heavy reduction.

At the end of the first week came an item telling of the British purchase of the Khedive of Egypt's shares in the Suez Canal (which was first opened in 1869). This gave Britain a controlling interest in the Canal. This was of vital interest for New Zealand's trade with Britain (and for travel to and from Britain). This issue had been followed avidly in New Zealand but at a large time difference of weeks or even months. Now it could be reported immediately.

Figure 15 Telegraph monument, Cable Bay

The name of the cable station bay was not overlooked in the two weeks following the establishment of the telegraph link. Not happy with the landing place being called a Mistake, the *Nelson Evening News* editorialised on Saturday 19 February that the name should be changed[29]. On 24 February, *The Colonist* reported that the name would be changed to the more prosaic Cable Bay, and it remains this today[30]. However, for the life of the cable station there until 1917, the station was called Wakapuaka, its cable address was WAKA, and staff and visitors called it either the Bay, Waka or Wakapuaka.

Life as a cable operator

By the mid-1850s, messages sent by the Morse code system could be received on an audible "sounder". This had the advantage of fewer errors and faster transcription. But a disadvantage of this system in the early days, including when the undersea cable came to New Zealand, was that only one message could be sent at a time. The operators had to wait until the line had cleared before the next message could be sent or a message received from the other direction.

There was also a maximum length of telegraph wire along which messages could successfully be sent with this system, so repeater stations were needed at frequent intervals. This caused a major problem with undersea cables, as by the time the cable was laid to New Zealand, 1,100 kilometres was the maximum length, and the cable was almost 3,000 kilometres long. That meant that with no undersea repeater stations possible, a different transmission system was needed. In 1858, William Thomson (later Lord Kelvin) introduced his Mirror Galvanometer. The galvanometer, an instrument for detecting and measuring small electric currents, had been discovered several decades before.

The sending instrument had two keys, one for dots and one for dashes. The sending was fairly similar to that by a Morse key, but receiving was quite different. The operating room had to have at least one black wall and to be as dark as possible. The signals came in from the cable to a galvanometer with a tiny mirror attached. A light source was focussed on the mirror so that the reflected light darted either left or right, denoting dots or dashes in accordance with the Morse code. Two operators were needed, one to watch the flashes and call out the letters, and the other to write them down. They worked with the added stress of being in a dark, airless and often very hot room. But, this system did not require the entire line to be clear before the next message was sent.

Figure 16 Cable officers' camp, La Perouse, 1876

The job of the telegraph or cable operator was a highly skilled one. Not only the ability to achieve the required speed and accuracy and be manually dexterous, the operator also had to have a good education and clear handwriting. By the mid-1870s, operators were trained in both forms of transmission, Mirror and Morse. After a probationary period, operators with EETC could eventually progress to a Station Superintendent position somewhere in the company's international telegraph network.

An international career operator would have to be able to live happily on an isolated station or series of stations on postings of four to six years at a time, often without his wife or family. There he would work six or seven-hour shifts, six days a week and often with overtime during busy periods. Leave for EETC staff only came after every four years of service in tropical stations or every six years in southern Australian or New Zealand stations.

The minimum acceptable completely accurate transmission rate for an overland telegraph operator was about 30 words a minute. A top-flight operator could get to 40-plus and sometimes as high as 60. However, undersea cable transmission was much slower. A Mirror Galvanometer operator had to be able to work at a minimum of three words a minute, and the best reached ten. These rates took no account of potential disruptions on overland lines or undersea cables, many caused by natural phenomena, such as storms, lightning strikes, aurora, earthquakes and undersea volcanic activity. The Java to Port Darwin cable was particularly susceptible to the latter two, crossing the boundary between the Eurasian and Indian Plates. However, the New Zealand cable was north of the Alpine Fault, remained on the Australian Plate and did not cross the Pacific Ocean proper.

At the time of laying the trans-Tasman cable, the working system was the Mirror Galvanometer. So the two-person staff at Cable Bay (Superintendent Shapley and Learner John Pattie) would have been sending and receiving words at the rate of three to ten a minute under uncomfortable and stressful conditions. Cable at this time was expected to last at least 10 years. But it was hoped it would last 25 or even 40 years, by which time it would be in such a poor state it would be cheaper to lay a new one. The 1876 cable was used, although with increasing breakdowns, for 41 years[31]. In the La Perouse instrument building were four of Thomson's mirror galvanometers and one of Morse's spare instruments[32].

A permanent Cable Station at La Perouse

Improvements to the original Cable Station

At the time of the cable laying in 1876, two temporary huts and four accommodation tents were provided by the New South Wales Government. The original 1876 cable station contained not only EETC staff operating the cable, but Postmaster-General's Department (PMG) staff operating the land line. The full staff complement is probably that given by Edward Cracknell on 6 January 1877 when he was asked to give space requirements for the proposed permanent quarters:

- 1 superintendent and electrician
- 5 cable clerks (operators)
- 1 battery man
- 2 domestic servants
- 2 clerks for the land line

By 1879, the Cable Station had been expanded and consisted of several structures:

- The Cable House a few yards from the beach, and masonry table for fitting up the cable equipment.
- The Cable Station or quarters on higher ground immediately behind. This included an office for the manager, an office for the PMG officials operating the land line, and three verandah rooms for servants. The building was 50ft by 40ft.
- Four water tanks connected to the guttering on the Cable Station to conserve rain water.
- A detached kitchen.
- A battery room, either part of the quarters or a separate structure[33].

The permanent Cable Station

On 16 October 1879, Edward Cracknell submitted details of the space requirements (in feet) for the permanent buildings:

- Four rooms for the superintendent and electrician.
- Six bedrooms for the operators, 16x14.
- Two bedrooms for the servants, 10x14.
- One mess room 24x16, room and store 20x16,
- Water tanks, stable and buggy shed,
- Battery room and store 20x16,
- Two instrument rooms 16x14,
- Superintendent's office 16x14.

In 1881, an estimated £3,978 was made available by the New South Wales Government for the Cable Station. It was designed by the Department of Public Works under the Colonial Architect James Barnet. The Government called for tenders for its construction on 4 January 1881 and the building was completed in 1882. Various repairs, alterations and additions were made to the cable station from 1883 onwards. Additions were done in 1890, coinciding with the duplication of the cable in that year.

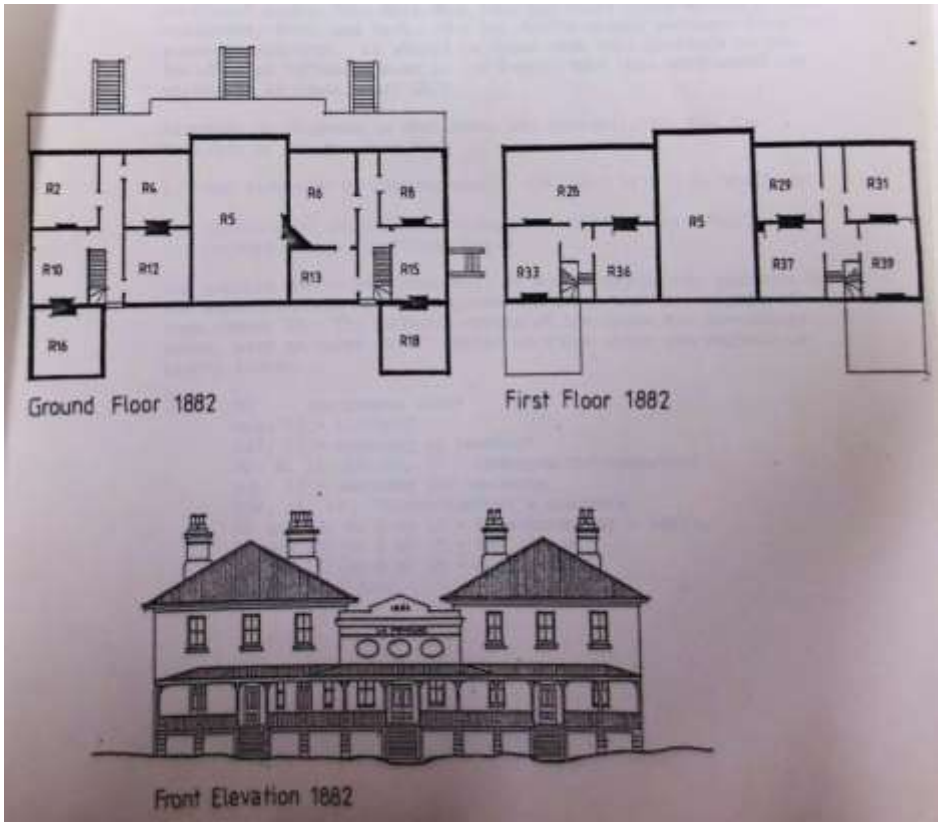


Figure 17 Cable Station plan, 1882 (NPWS study)

The expansion of telegraph business led to the construction of Yarra Bay House on nearby Yarra Point in 1903, and the operation of the telegraph service was transferred to this building. The 1882 buildings continued to be used as staff accommodation and probably as the training school for telegraph operators. In 1917, the decision was made to divert the telegraph cables to Bondi Beach and to extend the cable to the Sydney Telegraph Office in the city. Details of this are given in the section on Yarra Bay House, as telegraph operations were run from there at the time. The EETC closed both the Cable Station and Yarra Bay House in 1917.

Nurses' quarters for the Coast Hospital

Smallpox and the Coast

Smallpox is a fearful infectious disease that has devastated the world's population for thousands of years, causing the deaths of an estimated 400,000 Europeans per year near the end of the eighteenth century, including five reigning monarchs[34]. It is so named to distinguish it from the "great pox" (syphilis). It is one of the most contagious of the epidemic diseases and one of the deadliest to those without protection against it. The virus swarms in blisters on the skin, then when the blisters finally dry and the crusts peel off, the deadly virus is carried into the air, onto clothing and bedding, and often throughout the house of the infected person[35].

In the early decades of the colony, Australia was relatively free from smallpox due to its distance from Europe and Asia, and an effective quarantine policy under which ships arriving with disease were isolated at the quarantine station at North Head, established in 1832. But with the transition from sail to steam, diseases with a two- or three-week incubation period started to slip through the quarantine net.

On 29 April 1881, the steamship *Brisbane* arrived in Port Jackson from Hong Kong after a journey of three weeks. On board were 106 Chinese men in steerage, plus a cargo of oil, preserves, tea, cigars, opium and matting. The *Brisbane* reported to the quarantine station at North Head with a case of smallpox on board. Over the next few weeks, more cases were reported in The Rocks and Surry Hills, starting with a child in Lower George Street in The Rocks. Over the next three months, cases were reported in surrounding suburbs and as far away as Druitt Town and Croydon. Eventually, in the nine months from May 1881 to February 1882, 154 cases were notified, of which 40 died.

Figure 18 Horse-drawn ambulances, Coast Hospital

The epidemic was widespread and caused considerable alarm, leading to major changes in health administration. The first Board of Health was set up in response to the epidemic, with a broad range of representatives from local government, health, police and treasury. Its mandate was to

administer the *Infectious Diseases Supervision Act* of 1881, which introduced compulsory notification of smallpox and other infectious diseases. Another much-needed development was the establishment of a dedicated ambulance service, with personnel trained in infection control.

A hospital for infectious diseases was set up in 1882 at the isolated location of Little Bay, to the south of Sydney. The first patients were admitted to the rudimentary hospital in early 1882 at the tail end of the epidemic. It was known as the Coast Hospital, and from 1934 as Prince Henry Hospital[36]. It was the first public hospital in New South Wales and probably Australia. Until then, all hospitals had been set up and operated by charities and heavily subsidised by the government[37].

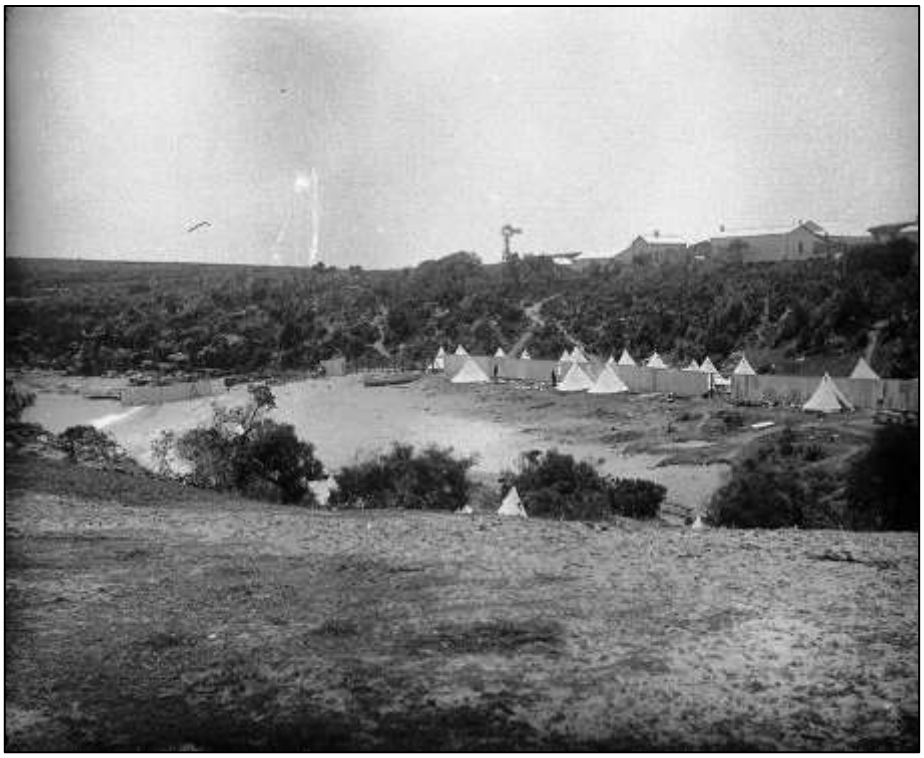


Figure 19 Coast Hospital bell tents, 1884

The influenza pandemic

An extraordinarily virulent influenza pandemic appeared in 1918 near the end of World War I and swept the world, carrying off an estimated 20 million people, more than died in the war itself. It is thought that the usual strain of influenza underwent a mutation to a highly dangerous variant. While the pandemic was raging overseas at the end of 1918, Australia was not affected until late January 1919, when large numbers of troops began to return from the Western Front.

The imported influenza attacked 20% to 50% of the population and was especially dangerous to young adults, men and pregnant women. The nurses at the 25 metropolitan hospitals suffered an infection rate of 55%, and no less at the Coast Hospital. But while there were severe cases among the staff, there were no deaths at the hospital. The dreaded complication was pneumonia, which was often quickly fatal, as there were then no antibiotics in those days. The pandemic produced a state of panic in the population, which was understandable as there was little to prevent its spread and no curative drugs.

Figure 20 Coast Hospital cemetery

The NSW Department of Public Health implemented a set of measures to limit the spread if possible: control of overseas and interstate travel, isolation of victims and contacts, restriction on the public assembly, closing of schools, free inoculation, and wearing masks in public places. However, these measures were ineffective in containing the spread of the disease and an air of anxiety and helplessness pervaded the community. During 1919, 2,966 admissions resulted in 313 deaths. The epidemic came in two distinct waves: February to April, then June to July 1919. This put great strain on the hospital staff, although staff numbers were augmented[38].

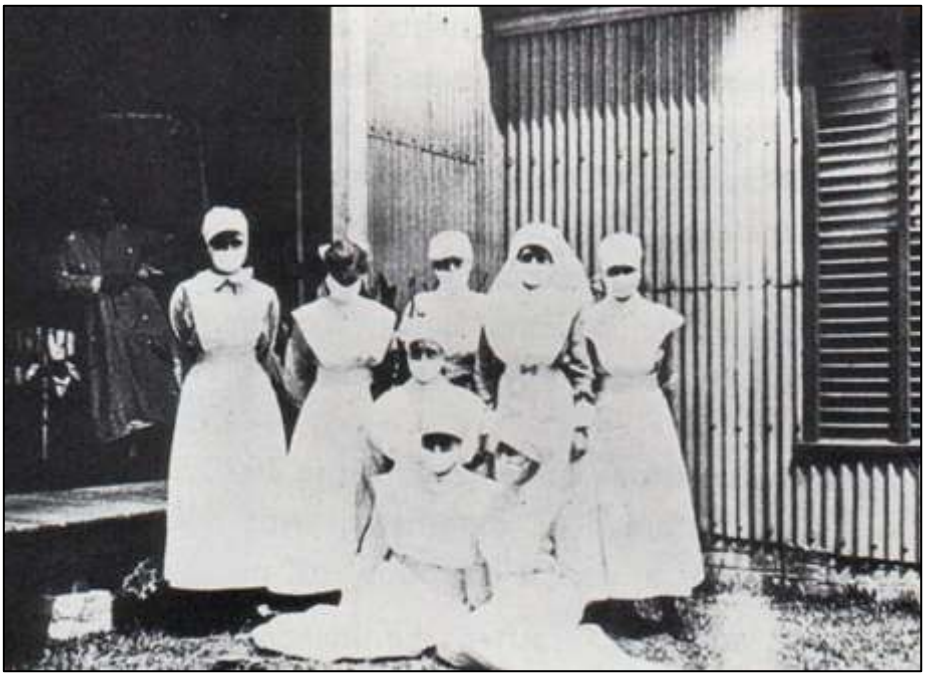


Figure 21 Coast Hospital nurses, influenza pandemic, 1919

Nurses' quarters and Happy Valley

The 1882 Cable Station may have been converted to an office for the Lands Survey Department in 1918 or 1919, as this is mentioned in the 1919 edition of *Sands' Directory*[39]. However, extra accommodation for influenza patients at the Coast Hospital was urgently needed in 1919, so the building was requisitioned by the Department of Health for this purpose.

After the epidemic, the Cable Station was retained by the hospital to house nurses on night duty. They seldom went to bed after breakfast. It was more relaxing to swim in the bay at La Perouse, have oyster-gathering parties on the rocks, take morning tea with the old Boer War veterans at nearby Bare Island, or laze dreamily on the grass. Vivid sunsets over Botany Bay softened the prospect of the long hours of night duty ahead[40].

Figure 22 Nurses riding camels at La Perouse

During the 1930s Depression, the night nurses at La Perouse were among the first to witness the arrival of the "Depression refugees" at Congwong Bay, one of the pretty beaches on Botany Bay. These were families from the city and suburbs who had been evicted from their homes because of non-payment of rent. They erected tents or flimsy shelters from any available material: wood, rusty iron, hessian, or cardboard. The shanty town was ironically named Happy Valley.

Figure 23 Happy Valley unemployment camp, c1932

Disease was rife in Happy Valley, and its residents crowded the verandah of the Outpatients Department of the hospital. Sometimes a doctor would admit an undernourished man, woman or child on some vague diagnosis simply to enable the patient to have some nourishing food for a few days. No one questioned the ethics of such admissions[41]. The building was listed as a Nurses' Home in *Sands' Directories* until the last edition in 1931-2[42].

Housing the troops

Between 1939 and 1944, the building was used for soldier accommodation for newly enlisted and mobilising forces, including Company B of the 2nd Garrison Battalion[43]. This unit was formed in New South Wales in October 1939 and was used through World War II as a Coastal Defence unit and was disbanded in 1945[44].

Salvation Army refuge

Soup, soap and salvation in Australia

In 1865, the British Methodist minister William Booth began the East London Christian Mission to preach the gospel to the poor and underprivileged. By 1867, it had developed into a ministry offering basic schooling, reading rooms, penny banks, soup kitchens and relief aid to the destitute. He said that their approach was to offer destitute people "the three S's": firstly soup, then soap and finally salvation[45].

Figure 24 William and Catherine Booth

Booth's wife Catherine was also an inspiring preacher and fundraiser, and played a leading role in determining the mission's direction and doctrines. From the beginning, she established equality for women to be ordained as ministers and hold leadership positions. This approach was much ahead of its time, and one which other churches are slowly catching up with in the present era.

Figure 25 Soup, soap and salvation logo

In 1878, William Booth changed the mission's name to the Salvation Army, and the now-familiar uniform was gradually adopted. Full-time ordained ministers took on military rank according to seniority. William Booth became the Salvation Army's General, and this remains the title given to the Army's international leader. The Salvation Army began operation in Australia in 1880 with public meetings initiated by immigrants who had converted to the Army back in Britain. Through the 1880s, British Salvation Army officers were sent to Australia to formally establish Corps in each State.

In 1883, James Barker, head of the Salvation Army in Victoria, established the Army's first permanent social institution in the world when he rented a house in Carlton to provide accommodation and find employment for prisoners discharged from Melbourne's gaols. Eventually a Social Wing of the Salvation Army was formed to address other areas of deprivation, such as unemployment, homeless children, aged care, drug and alcohol addiction, single mothers, child abuse and family violence[46].

Women's and children's refuge

In August 1944, the Government leased the Cable Station to the Salvation Army for use as a women's and children's refuge, the only one in Sydney until the late 1970s. The building was made available in an effort to address the acute housing shortage during wartime. Many women found refuge from violent marriages, misfortune and poverty.

Figure 26 Cable Station, c1953 (Max Dupain)

In 1965, the *Sydney Morning Herald* reported that hundreds of women and their young families had passed through its doors. They sought shelter there, and were sometimes destitute, frightened and alone in the world. They were given food, shelter and spiritual comfort. The reporter was immediately impressed by the informal air, the gay cretonne curtains, pastel coloured walls and the home-like atmosphere. The number of people staying could fluctuate between six and 51 at any time. Girls and boys of primary school age were accepted, and they attended La Perouse Public

School. Children up to eight years old stayed with their mothers. The matron in 1965 was Major Ruth Fox, an officer for 30 years, who had been at La Perouse for six years[47]. It continued operating as a refuge until it was closed in 1988.

Figure 27 Salvation Army Women's Refuge, La Perouse, c1987

Preserving the past – the museum and monuments

A museum to commemorate Laperouse

In 1984, at the instigation of the French Consul-General in Sydney, a group of Australian and French citizens decided that an appropriate contribution to the 1988 Bicentennial celebrations would be a museum dedicated to the explorations of Laperouse and other French navigators in the Pacific. The Laperouse Association was duly formed to realise the project. The Darling Harbour Maritime Museum was keen to accommodate the project in their building, but others suggested a French museum could be built in Western Australia, where French navigators had been more active than New South Wales (although Laperouse never called there). However, the Laperouse Association wanted the museum to be in the Cable Station on the spot where Laperouse landed and spent six weeks, and where the two monuments to his visit were located.

Figure 28 Louis XVI's final instructions to Laperouse (standing), 1785

Much goodwill was required by the National Parks and Wildlife Service (which controls the La Perouse foreshore area) and the New South Wales Bicentennial Council to bring the project to fruition. The relocation of the Salvation Army refuge had to be organised and finance had to be found for the building restoration. Funding was shared between Laperouse Association fundraising ($350,000), the French Government ($450,000) and the Bicentennial Council ($500,000). The work was completed in 1988 by the Department of Public Works, and the museum was officially opened on 23 February by Bob Carr, the Minister for the Arts[48].

Laperouse monument

The French explorer Baron Hyacinthe de Bougainville (1781-1846) first visited Sydney in 1802 as a midshipman in Nicolas Baudin's expedition to map the coast of Australia. He returned in 1825 as the leader of an expedition to circumnavigate the globe, and stayed in Sydney for three months. Accompanied by Captain John Piper, he visited the north side of Botany Bay where Laperouse had

spent six weeks in early 1788 before he sailed off into the Pacific and an unknown fate. De Bougainville inspected the items remaining from the 1788 expedition, including the post holes for the stockade, the vegetable garden, and the grave of Father Receveur (marked by an inscription on a nearby tree left by the officers of the French corvette *Coquille* in March 1824).

Figure 29 Laperouse Monument, c1885

As soon as de Bougainville learned that there were relics of Laperouse's stopover in New South Wales, he got the idea of erecting a monument to their illustrious but unfortunate compatriot on the spot where his last message had been dispatched just before his departure. With Captain Piper's assistance, he decided on the exact site of the proposed monument and a mausoleum for Father Receveur. De Bougainville approached Governor Sir Thomas Brisbane with his plans and committed official French funds (although without asking the French government for their permission).

This was a spontaneous initiative by de Bougainville, who felt strongly that it was something he simply had to do before he left Sydney. He intended to invest his own money if the French government refused. Brisbane had a great deal of affection for France, and was a regular correspondent with his fellow astronomers at the French Academy of Science. He granted an area of 176 square yards for the monument and a further 70 square yards for Father Receveur's grave, located 136 yards from the monument.

The Foundation Stone of the Laperouse Monument was laid on 6 September 1825 by de Bougainville, accompanied by his colleague Captain Ducamper of the corvette *Esperance*. Local worthies present were the engineer Major John Ovens, Naval officer Captain John Piper (representing Governor Brisbane) and James Macarthur[50]. The monument was completed in 1829, and four Norfolk Island pines were planted inside the four corners of the perimeter fence.

Figure 30 French mission at the La Perouse Monument, c1918

The funding of the monument proposed by de Bougainville in 1825 became an intensely personal expression of the regard for the Laperouse expedition held by officers of French expedition ships, and they collected money among themselves to raise the monument. The monument and grave have come to be seen as a symbol of French-Australian goodwill that continues to be celebrated at La Perouse with annual events as well as a tradition of visits from French sea captains bearing a gift of their ship's plaque. The monument became a pilgrimage site for French sailors, and in the 1880s, the crew of the French ship *Le Bruat* attached their ship's plaque to the moment, thus starting the ritual of plaque tributes. Now there are about 36 plaques attached to the base of the monument.

Father Receveur's grave

Father Claude-Francois Joseph Louis Receveur (1757-1788) was a French priest, naturalist and astronomer who sailed with Laperouse on his expedition of circumnavigation from 1785 to 1788. In December 1787, the expedition arrived in the Samoan Islands where the crew came into conflict with the indigenous people and Receveur was gravely injured in the eye, while eleven other crewmen were killed. He never recovered from his injuries and died at La Perouse on 17 February 1788. He was buried at Laperouse's camp.

Receveur's grave was originally marked with a painted epitaph fixed on a nearby tree trunk. This was torn down soon afterwards by the local people and Governor Arthur Phillip ordered a replacement engraved on copper. Then when Louis Duperrey's expedition arrived in NSW on the *Coquille* in 1824, some of the officers searched for Laperouse's campsite and Receveur's grave. After they found the

grave, they carved the trunk of a large eucalyptus which shaded the site with the words which translate as “Near this tree lie the remains of Father Receveur, visited in March 1824”. The inscription was presented to France by the New South Wales Government for the Paris Exhibition of 1855. It was exhibited at the Musee de la Marine in Paris until being returned to the Laperouse Museum as a gift in 1988.

Figure 31 Father Receveur's grave

When Baron de Bougainville visited the site in 1825, he found the inscription and the grave marked by a pile of stones holding up a cross. He commissioned and paid for the present tombstone. In 1876, the New South Wales Government enclosed the grave when the telegraph cable service came into operation. A new metal fence was installed in 1906 and the badly rusted iron crucifix was replaced by one of bronze in 1930[50].

Almost a bit of France

In 1917, William Holman (1871-1934), Premier of New South Wales and admirer of the French people, proposed making a grant of land at La Perouse to France as a gesture of goodwill and friendship. He wanted to grant to the French Republic in fee simple the area occupied by the Laperouse Monument and Father Receveur’s grave. A bill to that effect was prepared, but it was never introduced into Parliament and the idea did not proceed any further.

It was later thought that the five acres of foreign-owned land might cause embarrassment and legal difficulties. If a miscreant fleeing justice stepped into the bit of France at La Perouse, international extradition laws would have to be invoked before the person could be brought a step or two back into New South Wales to face justice. Holman was a lawyer, and apparently acknowledged the problem. After he left office, nothing more was heard of what was meant as a gesture to a friendly nation. However, other public statements by politicians of the day, reinforced by an article in the *Australian Encyclopedia*, led many people to believe that La Perouse had in fact been given to the French nation in perpetuity, but it remains part of New South Wales[61].

The Defence of La Perouse

Macquarie Watchtower

Watching the bay

In about 1820, a small detachment of soldiers was stationed on the La Perouse headland to watch for smugglers and unexpected foreign ships entering Botany Bay. The troops appropriated the garden established by Laperouse in 1788 for their use. Initially the men lived in huts, then in about 1822 an octagonal sandstone watchtower was constructed to replace the huts and provide a better view of the bay. The original design allowed for a Corporal and two or three Privates[52].

The tower was used until 1826, when it was evidently abandoned by the troops. It is thought that the Norfolk Island pines were planted by Governor Sir Ralph Darling in 1826. In 1829, works were carried out to accommodate the new caretaker (the former convict Patrick Lally), who would oversee the recently constructed La Perouse monuments.

Figure 32 Macquarie Watchtower

A duty to pay

In 1831, the newly-formed Department of Customs acquired the tower as part of a network of coastal outstations, with David Goodsir appointed the first civil coastguard. As well as collecting customs duties on goods brought in to Botany Bay and combating tobacco and alcohol smuggling, coast watchers also helped to capture escaped convicts, keep local order and rescue distressed seamen[53]. A boatman's hut and a shed were built near the tower to accommodate the new staff.

In about 1864, a conical peaked roof was added to the tower, replacing the former flat roof. At around this time, it was renamed Delaperouse Tower. Then in 1868, a room in the tower was dedicated as a schoolhouse for the Botany Heads Provisional School, which closed in 1890 and reopened in 1892 as the Botany Heads Public School. The students were the children of local market gardeners, fishermen, customs employees and local aborigines. In 1873, the Customs Officer built an additional room to the watchtower for use as a schoolroom. The school continued until 1910 when a new public school was built at Phillip Bay.

In 1903, the customs station was transferred to the New South Wales Government. The following year, the customs operation ceased and the tower was transferred to the Department of Internal Affairs, under whose management it housed a series of tenants and caretakers until 1957.

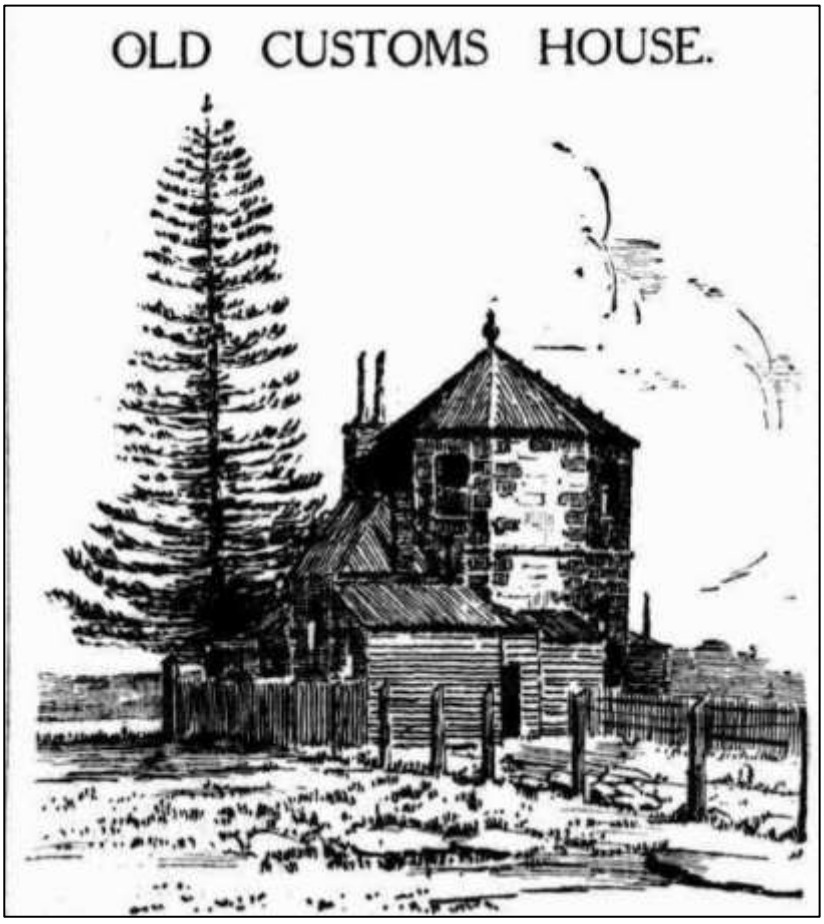


Figure 33 Macquarie Watchtower in 1940

Caring for the monuments

In 1950, the tower site was reserved by the Government and placed under the care of the La Perouse Monuments Trust. In October 1957, a fire gutted the building and caused the death of Mary

Connelly, the caretaker's wife. All the lighting in the tower was by candles and kerosene lamps, and it was thought that Mrs. Connelly accidentally knocked over a kerosene lamp or heater during the night, setting fire to the interior and trapping her inside.

After the fire, the Government decided to clean up the site and restore the original tower form. The 1961 Lands Department reconstruction work on the tower was intended to match as closely as possible its 1820s form, except for blocking up the windows to prevent vandalism. In 1967, the National Parks and Wildlife Service acquired the site. Restoration programs were undertaken in 2006 and 2010.

The tower is the only known coastal watchtower from the penal era specifically constructed for border protection and the prevention of smuggling in Australia. It is thought to be the oldest of a small group of nineteenth century stone towers in the country. It is a rare surviving symbol of the vexatious issue of customs barriers between the colonies, which was one of the main factors underlying the push for Federation[54].

Bare Island Fort

The need for self defence

Bare Island is a small island off the northern headland of Botany Bay that contains nineteenth century coastal defence fortifications. It is connected by a footbridge to the suburb of La Perouse. Captain James Cook noted when he was there in 1770 that "a small bare island" provided a convenient navigation marker for ships entering Botany Bay, and the name stuck from this first usage. From 1788, the defence of the Australian colonies had been managed by a succession of British military regiments. But the removal of the remaining British troops in 1870 (except those paid for by colonial governments) forced a rethink of local defence preparedness, especially after Britain and Russia almost went to war in 1876-1878 over Turkey's involvement in the Balkans[55].

New South Wales Colonial Architect James Barnet was charged with designing a new set of fortifications for the colony. Forts and barracks were duly constructed on most of the headlands of Sydney Harbour, but Botany Bay was not considered to be a priority at the time. Then in 1877, in response to complaints of a lack of strategic planning and inadequate fortifications, the Australian colonies requested the British Government for the services of an Imperial Engineer to advise them on their own defence. Military engineers Peter Scratchley and William Jervois were sent out in 1877.

By then, Botany Bay was thought to be vulnerable point for an attack on Sydney's "back door" from the sea, so Jervois recommended the fortification of Bare Island with five guns and barracks to accommodate eighty men, and this was accepted by the New South Wales Government. Scratchley produced a design and Barnet prepared the specifications. The semi-circular fort would consist of a main 18-ton 10-inch muzzle-loading gun centrally mounted in an armoured vault with an opening to fire through, supported by two smaller nine-inch guns firing over parapets. The flanks were protected by two 80-pounder guns[56].

The fort was completed in 1885, and work on the interior began in 1889. However, a Royal Commission in 1890 found that construction was faulty due to the use of poor quality concrete. The Royal Commissioners were so scathing of the material that they remarked that "the concrete…was so inferior in quality as to hardly deserve the name concrete at all". The fort was an early construction from mass concrete when the use of this material was still uncommon and not well understood.

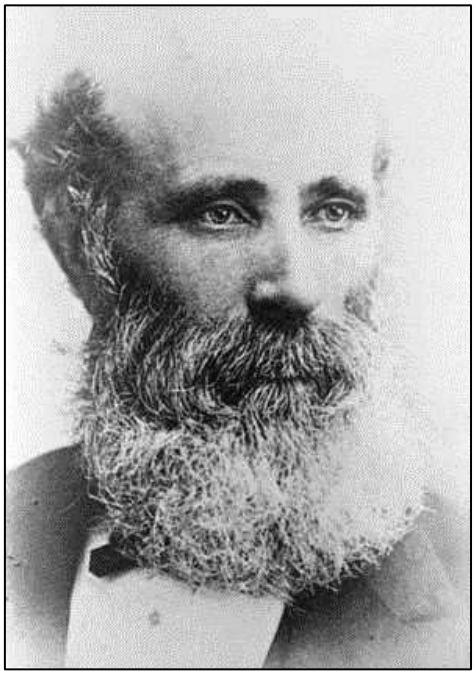


Figure 34 James Barnet

As well as negligence by the contractor and the two clerks responsible for the operation, James Barnet was blamed for failing to oversee the project, leading to his resignation in disgrace from the government office. Though bristling with several large guns, the fort was soon made redundant by advances in technology, mainly armour plating on warships that would not be penetrated by the island's guns. By 1902 its guns had never been fired in anger, and it was decommissioned and ceased to function as a military fortification, leaving only a handful of personnel on duty. By 1908, no substantial military activity was occurring there[57].

Figure 35 Bare Island Fort

War Veterans Home and museum

In 1912, Bare Island became the first retirement home in Australia for war veterans from campaigns in the Crimea (1853-1856), Sudan (1881-1899), China (1899-1901), and the Boer War (1899-1902). It continued to operate as a retirement home until 1963, except during World War II when it was used for military purposes. This use of the fort to accommodate war veterans reflected the social and moral obligations felt at the end of the nineteenth century to the veterans of wars fought across the British Empire.

In 1963, Randwick District Historical Society (RDHS) became caretakers of the island. The Society also involved other groups such as the Fort Artillery Society, who wore period costumes and conducted live firings of the nine-inch gun. These were very popular and became a regular attraction.

Bare Island Historic Site was placed under the care of the National Parks and Wildlife Service (NPWS) in October 1967, although the RDHS continued to maintain their museum and associated activities. The live firings stopped in 1974, and the fort was closed to the public in 1991. The current use of the island by NPWS is to conduct guided tours[58]. In addition to its heritage value, Bare Island is one of the most popular scuba diving sites in NSW.

Aboriginal settlement at La Perouse

Acknowledgement of country

The author acknowledges the Dharawal (Tharawal) people upon whose ancestral lands La Perouse is now located. He would also like to pay respect to the Elders both past and present, acknowledging them as the traditional custodians of knowledge for these lands.

Early settlement and displacement

Aboriginal occupation of the La Perouse area has been dated by the radiocarbon method to at least 7,500 years ago[59]. During the 19th century, the vast majority of the Sydney indigenous communities were forced off their land into regional areas, including the south coast of New South Wales. But when the south coast was subdivided for dairy farming from the 1870s, these indigenous communities were again landless and began to drift back to Sydney or up the north coast. Several locations in Sydney including Blacktown and La Perouse became informal refuges[60].

By the 1850s, only remnants of the original Aboriginal tribe survived at La Perouse. The increasing European population also displaced Aborigines of other tribes, some of whom sought refuge at La Perouse. In the 1880s, the New South Wales Government and its newly formed Aborigines Protection Board (established in 1883, it gained legal powers in 1909 and had wide-ranging control over the lives of Aboriginal people, including the power to remove children from families) were keen to remove Aboriginal people from Sydney's suburbs and wanted to wind up Aboriginal camps, including those on Botany Bay.

At La Perouse, a group of mostly Dharawal (or Tharawal) people, linked with the Wollongong and Burragorang areas (in the Macarthur region near the Warragamba Dam), occupied Crown land and lived by fishing, casual labour and selling baskets made by the women. This site, outside the city limits, was tolerable to the government. It became a quasi-institution for Aboriginal people. It is known as Gooriwaal (with several other spellings)[61].

The La Perouse Mission Church

During the mid-1880s, missionary work was begun among the Aboriginal people at La Perouse by a number of Christian groups[62]. In addition to providing food, shelter and basic education, the missionaries also provided religious instruction[63]. They introduced shell-work to the women, and this was one of the main activities that attracted tourists to the area. The men produced wooden artefacts for the tourist market[64].

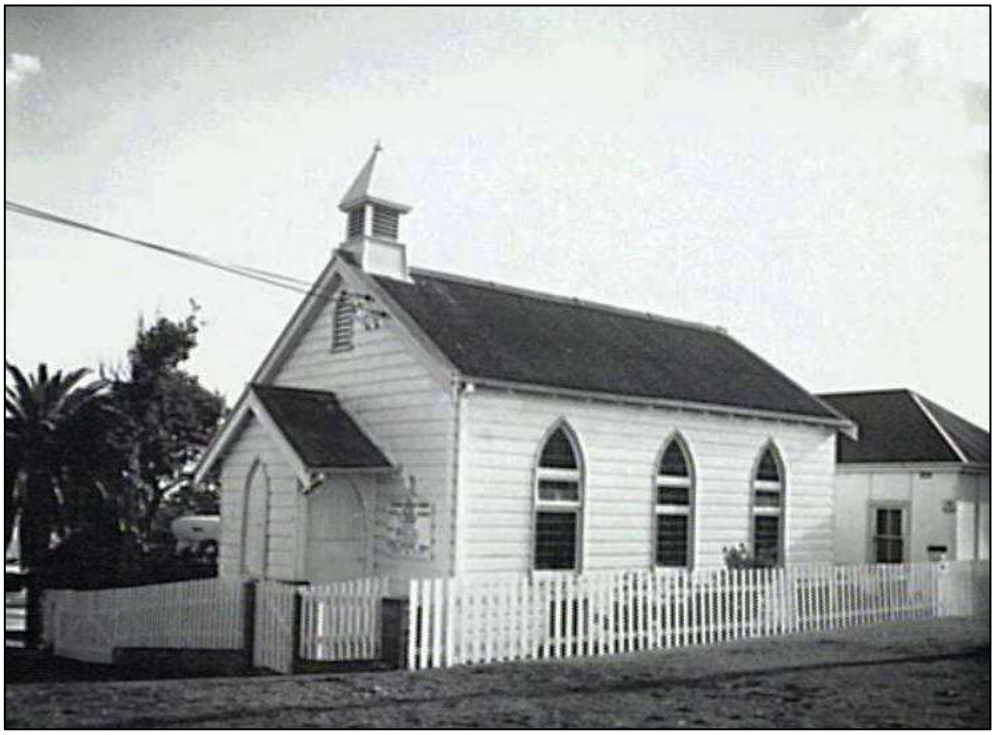


Figure 36 La Perouse Mission Church, c1986

One of these groups, the Petersham Congregational Christian Endeavour, formed an Aboriginal committee. This group, which was later called the La Perouse Aborigines Christian Endeavour Society, built the original mission church on the sand at Frenchman's Beach in the reserve in 1894. The church was relocated from the beach to its present location on the corner of Elaroo Avenue and Adina Avenue in 1929-30 because the building was sinking into the sand.

The six rows of adjustable pews on each side of the centre aisle are believed to have originally been tram seats. The church has not been used since services ceased in the 1990s. Services to the building have been disconnected and the building was condemned by Randwick Council in 2012. The La Perouse Aboriginal Mission later became the United Aborigines Mission, a non-denominational faith mission dedicated to evangelising among the Aboriginal people. In 2015 a Conservation Management Plan was prepared for the La Perouse Local Aboriginal Land Council with a view to restoring the heritage-listed church[65].

Figure 37 La Perouse Mission Church pews

The Aboriginal Reserve

While aboriginal occupation at the La Perouse area has been continuous from the prehistoric period, their claim to the land was partially recognised in March 1896 when seven acres of land was gazetted for the La Perouse Aboriginal Reserve[66]. Botany Police persuaded the Aborigines Protection Board to ring the settlement with barbed wire, and the missionary, Retta Dixon, was given a key to let fishermen out to sell their catch[67].

Despite Government approval for the Reserve, other communities in the area were not happy about it, and the Aborigines Protection Board was obliged to defend the Reserve's continued existence to the Government on a number of occasions. For example, in 1902 the objection seemed to be that Aborigines from other parts of the country were coming to the Reserve, where they received rations at Government expense[68]. Then in 1906, the New South Wales Aborigines Mission wrote to the Aborigines Protection Board requesting that no-one be forced to leave the Reserve (the Government replied that they had simply asked the people if they would like to move to Kurnell)[69]. By 1910, there were about 80 Aborigines at the Reserve[70].

In 1928, the Australian Aborigines Mission president, Mr. T. E. Colebrook, wrote to the Mayor of Randwick Council claiming that the Council wanted to close the Reserve and convert the land into a rate-paying asset (being on Crown land, the Reserve did not pay Council rates). Newspaper coverage of the opening of the small Colebrook Memorial Church inside the Reserve in 1933 seemed to reflect contemporary views on the future (or lack of it) of the Aboriginal people with its headline "Church at La Perouse – Memorial to Doomed Race"[71].

Far West Children's holiday camp

From 1949, the Far West Children's Health Scheme arranged to send some 25 Aboriginal children to a summer seaside camp for four weeks in the Reserve. They would be in the charge of a welfare officer attached to the Aborigines Protection Board's staff, Mr. R Dellow and his wife, who would be assisted by residents from the La Perouse Aboriginal Reserve. The children would be selected from

the Far West communities, and the change from the summer heat of western NSW would be most enjoyable and beneficial[72]. This camp became an annual event for some years.

Figure 38 Children's summer camp, 1960

The telegraph moves to Yarra Bay House

Expansion of the telegraph operation

The steady increase in telegraph business meant that by 1900 the Cable Station building was no longer able to cater for the greater number of staff and several trainees, as well as providing accommodation for them. EETC decided to construct a larger building nearby as an operation centre and to use the 1882 building to house most of the staff.

The Aboriginal Reserve was subdivided in 1899 and a parcel of land on Yarra Point was sold to the company. Yarra Bay House was built in 1903 at 1 Elaroo Avenue, and the telegraph cables were diverted from the La Perouse Cable Station to the new building. Both the 1876 and 1890 cables were partially taken up at the shore end and re-laid across to Yarra Point where the landfall of the cables was still visible in 1988. The ground floor became the main office or instrument room and the upper floor became the Superintendent's quarters[73].

Figure 39 Yarra Bay House

The daily operation of a cable station

In May 1904, a reporter from the *Sydney Morning Herald* visited the new Cable Station and described in detail the daily operation of the station. The superintendent was Mr. W. H. Raymond, and his second in command was Mr. W. A. Huxtable. On average, the station dealt with 200 messages a day. All outgoing messages were for New Zealand, but inward messages could be for transmission to any part of the world. There were 17 staff, but it had recently become a training station, and several of the staff were cadets in training. After being trained they would be tested, and if proficient would be drafted to Hong Kong or Perth or Singapore or anywhere within the worldwide sphere of EETC's operations where their services were required.

The cable station was open from about 5:30am until midnight, with the staff working in three shifts. In the testing room was the Wheatstone bridge. This machine tested the cable every fortnight, and the exact degree of efficiency was recorded. If the cable became broken or faulty, this device would ascertain the location of the break. Its use was to regulate and measure the intensity of the electric current which ran along the cable.

Another part of the apparatus of the testing room was a mirror galvanometer. A lamp sent a tiny beam of light through a slit opening towards a mirror some three feet away. The beam was reflected from there to a finely-graduated scale, on which, as the current varied, it danced to and fro. Previously, this was how telegraphic messages were received. When the light moved to one side it meant a dot, to the other side meant a dash. But that method was slow, and left no record in case of error. So the galvanometer was abandoned some years ago and replaced by a permanent magnet recorder. The machine wrote a continuous ragged zig-zag mark which was a type of Morse code.

In the cable room at La Perouse. The operator is seen in the act of reading the message "Sunday Times" sent across from New Zealand.

Figure 40 Yarra Bay House cable room, 1908

In the event of a break in the cable, the amount of current a cable would hold (using the Wheatstone bridge to test it) enabled the distance of the fracture to be calculated. Sea charts were kept which showed the soundings at the spot where the break had occurred. When this happened, these details were wired to the cable repair ship, which was generally kept at Adelaide. The ship wired back an estimated day and time to arrive at the spot, and went out to find the cable.

From the time the ship indicated it would arrive at the broken cable, the operators kept an eye on the beam of light, day and night. When the ship arrived at the cable, a signal was sent to determine which side of the break they were on. When they found one end of the broken cable, they spliced a

new piece on, then searched for the other broken end. Bad weather could arise, in which case the ship would have to run to shelter, and it could be a week before she picked the cable up again.

The officers of a cable station had to be absolutely self-reliant. They needed to know how to make their own instruments, or any part of them, and had to have the necessary tools and materials on hand. There were two cables from La Perouse to New Zealand, and the 1890 cable was worked on the duplex system, that is, messages were simultaneously sent and received on it. The company could send messages to London by several different routes. One was from Sydney to Adelaide, then by Government landlines to Darwin, then via Singapore, Penang, Madras to Bombay by Indian land line, Aden, Suez, Alexandria, Malta, and Gibraltar, to Port Curnow (at Land's End, Cornwall, England).

Another route was by land to Adelaide and Perth, then to Cocos Islands, Rodriguez, Durban, Zanzibar, Aden, and up to the Red Sea as before, or from Durban via St Helena and the Ascension Islands to Penzance (on the south coast of England). The Cocos Island route was all British. When asked how long it took to send a message to England, the superintendent said it depended on the state of traffic. If business was heavy, a reply could come in three hours, if not in an hour and a half. If an express message was sent by the company about its own affairs, a reply could come within an hour. However, if special arrangements were made, it could be done much more rapidly.

In November 1894, on the occasion of a presentation at the Colonial Institute to the late Sir John Pender, His Majesty King Edward VII sent a message which passed right around the world and reached him again in less than five minutes. This makes Puck's claim that he would put a girdle around the earth in 40 minutes seem very unimpressive! (In *A Midsummer Night's Dream*, Act II, Scene 1)[74].

In 1917, the two telegraph cables were diverted to Bondi Beach and the Cable Station at Yarra Bay House was closed. In 1919, the building was temporarily acquired by the Department of Health for additional accommodation of convalescent patients during the influenza pandemic. It was staffed and equipped with 31 beds, and between March 1919 and August 1919, 822 convalescent flu patients were treated there[75].

Child welfare institutions at Yarra Bay House

La Perouse Training School for Girls

In June 1927, the Child Welfare Department announced it had bought Yarra Bay House, at a cost of £7,000, intending to convert it into a girls' industrial school to alleviate overcrowding at the Parramatta Industrial School[76]. The La Perouse Training School for Girls opened as an annex of the Parramatta school and was proclaimed on 28 July 1928 under the control of Parramatta's superintendent. A resident matron was responsible for day-to-day operations[77]. Soon about 50 girls were living at La Perouse[78].

The girls housed in La Perouse were considered to be younger and better behaved than the girls in Parramatta. The discipline was also more relaxed at La Perouse. The curriculum emphasised domestic duties, but girls were allowed a degree of freedom to enjoy their beachside location. It was closed as a girls' training school in 1939[79].

Yarra Bay House Truant School

In 1939, the Child Welfare Department opened the building as the Yarra Bay House Truant School. Truancy from school was an offence under both the *Child Instruction Act* and the *Child Welfare Act*, and could attract a sentence of up to two years in a special school. Most truants were boys. Although designed as a truancy school, oral history accounts from former occupants show that Yarra Bay House received general welfare cases waiting for foster care placement.

Boys were taken on outings to Taronga Park Zoo and Manly. While there was no schooling at Yarra Bay, it was a much gentler place than Royleston, which many of the boys thought of as a prison staffed by pedophiles. The school closed in about 1955[80].

Yarra Bay Boys' Home

In the mid-1950s, the Child Welfare Department formally changed the name of the home to Yarra Bay Boys' Home[81]. By the 1960s, it held 40 primary school-aged boys and had its own school. It seems a severe shortage of foster placements was the main reason boys were detained there[82]. In 1977, as the demand for residential facilities for children fell, the Department of Youth and Community Services thought Yarra Bay might be a useful venue for special resocialisation programmes for intellectually disabled people. But little seems to have happened and by the 1980s, the house was empty[83].

Figure 41 Title deed presentation by George Paciullo, 1984

Ownership of the Aboriginal Reserve and Yarra Bay House

When the Aborigines Welfare Board was abolished in 1969, the La Perouse community campaigned successfully to remain on the La Perouse Aboriginal Reserve. They then waged another campaign to gain control of the land. By the 1980s, the Aboriginal community was making use of Yarra Bay House as a childcare centre and a base for the Aboriginal Medical Centre.

In 1984, the title deed for the land on which the settlement had stood was handed over to the La Perouse Local Aboriginal Land Council. This included the original portion separated for Yarra Bay House and the building. The local Land Council is still based at Yarra Bay House, supporting the community[84].

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Glossary

All Red Line

The system of electric telegraph lines and cables that linked much of the British Empire. The name is derived from the common practice of colouring British colonial territories red or pink on maps.

Capacitance

The ability of a body to store electrical charge. Its effect on a telegraph line is to slow the speed of electrical signals along the line.

Cooke and Wheatstone telegraph

A telegraph system in which the receiver consisted of a number of needles which could be moved by electromagnetic coils to point to letters on a board. It was easy to use, but complex to build and maintain as it required multiple wires.

Duplex communications

A communication system in which two connected parties can communicate with each other in both directions simultaneously.

Electric telegraph

A battery-powered system that uses electrical signals sent along copper wires to convey information in the form of pulses such as the Morse Code system.

Electromagnet

A type of magnet in which a temporary magnetic field is produced by an electric current. Insulated wire is wound around a ferromagnetic material like iron to increase the magnetic field.

Electromagnetic induction

This is the production of a voltage along a conductor due to its interaction with a magnetic field. In other words, magnetism can produce electricity.

Galvanometer

This is an instrument for detecting and measuring electrical currents, especially small amounts of current as in undersea telegraph cables.

Gutta percha

Latex from trees found in Malaya that was much better than Indian rubber for insulating undersea telegraph cables

Inductance

This is the property of an electrical conductor by which a change in current produces an electromotive force or voltage in the conductor. The effect on telegraph lines, as with capacitance, is to reduce the signal speed.

Meidinger cell

A glass battery using copper and zinc plates immersed in solutions of copper sulphate and magnesium sulphate. It produced low voltages but operated for several months.

Microwave communication

Transmission of information by electromagnetic waves with wavelengths of a few centimetres, in the radio frequency range of 1 GHz to 300 GHz. Their advantage is in the use of small antennas receiving signals directed to them in narrow beams with a high information bandwidth.

Mirror galvanometer

This is an instrument that indicates that it has sensed an electric current by deflecting a light beam with a mirror. It was used in undersea cable systems to interpret weak currents as dots or dashes to convey telegraph information.

Morse Code

A system of short and long pulses in combinations representing letters and numbers. It is the most common method of transmitting information along telegraph wires.

Morse telegraph system

This is a single-wire electric telegraph developed by Samuel Morse system that sends pulses along a wire to a receiver who interprets the different combinations of pulses as letters and numbers.

Optical fibre

This is a flexible fibre made by drawing glass or plastic to very thin strands, which is used for communication over longer distances and higher bandwidths than metal wires. It is now the most common form of long-distance cable communication now.

Permanent magnet (or siphon) recorder

A telegraph receiver that wrote a ragged ink mark to record incoming electrical signals on paper which could be decoded to read a message. It was an improvement on the mirror galvanometer which did not create a record of the message.

Radiocarbon dating

A method of determining the age of organic material using the properties of carbon 14, a radioactive isotope of carbon which decays at a known rate from the time the plant (or animal who has eaten the plant) dies. Material up to about 50,000 years old can be reliably dated by this method.

Smallpox vaccine

Edward Jenner developed the first successful vaccine for smallpox in 1796 after observing that milkmaids who had caught cowpox did not then catch smallpox. He inoculated test subjects with cowpox material and showed that they were then immunised against the more serious smallpox. It was widely adopted and saved millions of lives.

Static electricity

This is an imbalance of electric charge in or on the surface of a material that remains until it is able to move away by means of an electrical conductor.

Wheatstone bridge

This is an electrical circuit used to accurately measure the electrical resistance in an electrical circuit. It is used in telegraph systems to determine if a break in the cable is affecting the signals.

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