World Connections - Charles Todd and the Overland Telegraph

Royal Geographical Society of South Australia

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Overland Telegraph
150th Anniversary
1872-2022

World Connections 1872- Charles Todd and the Overland Telegraph

Introduction

In 1872 Australia was first linked to the rest of the world in October 1872 by a submarine telegraph cable at Darwin. The Overland Telegraph connected Australia to the rest of the world through Adelaide, South Australia. This brought news reports from the rest of the world.

In 1852 worldwide postal speeds were notoriously slow. A letter by post from London took many days to reach its destination.

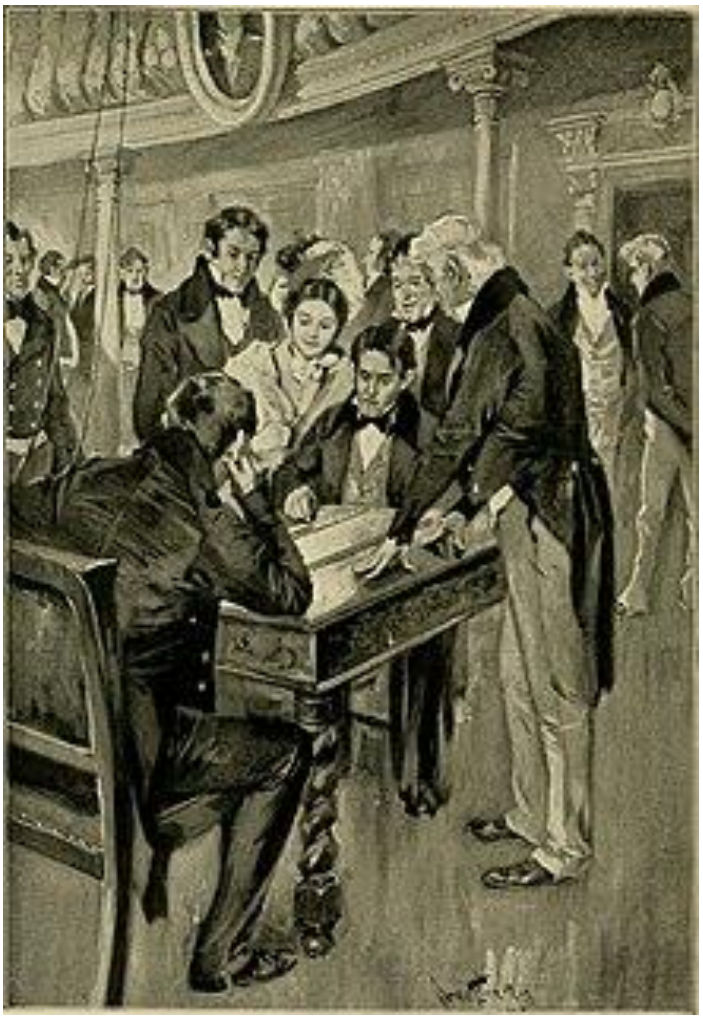
New York in the United States	12 days
Alexandria in Egypt	13 days
Constantinople in Ottoman Turkey	19 days
Bombay in India (west coast of India)	33 days
Calcutta in Bengal (east coast of India)	44 days
Singapore	45 days
Shanghai in China	57 days
Sydney in Australia	73 days

The Overland telegraph meant that instead of waiting eight to ten weeks wait for information from London it became a 24 hour wait.

The Overland Telegraph employed modern and ground breaking technology and Australia became one of the international leaders in the field. In 1854, the British government in London created a military Telegraph Detachment for the Army in. During the American Civil War in the 1860s the telegraph proved its value as a tactical, operational, and strategic communication medium and an important contributor to Union victory The Crimean War in the 1880s was one of the first conflicts to use telegraphs and was one of the first to be documented extensively

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Morse system



Communication via the Telegraph was only possible because of the revolutionary technology of Morse code. Morse code represented the first time in human history that complex thoughts could be communicated at long distances almost instantaneously.

In 1851, a conference in Vienna of countries in the German-Austrian Telegraph Union (which included many central European countries) adopted the Morse telegraph as the system for international communications. The International Morse Code was considerably modified from the original American Morse Code and was based on a code used on Hamburg railways. With different codes, additional operators were required to translate and retransmit the message. In 1865, a conference in Paris adopted Gerke's code as the International Morse code and was henceforth the international standard. The US, however, continued to use American Morse code internally for some time, hence international messages required retransmission in both directions.

The construction of the Overland Telegraph

In 1872 there was no connection between Adelaide, South Australia and Darwin apart from a sea route. In 1872 the 34-year-old Charles Todd, the South Australian Superintendent of Telegraphs, was the given responsibility for leading the construction of the Overland Telegraph. A professional explorer, John Ross, a professional explorer, was employed to lead exploration of the route for the line.

The telegraph line would be more than three thousand kilometres long, through country that had only been crossed once by John McDouall Stuart in 1862. The country was, for

the most part, uninhabited by Europeans.

The Overland Telegraph Line crossed 3,200km through mountains, flood plains and desert. It was one of the greatest engineering achievements of the 19th century.

Todd devised three teams of construction, Northern, Central and Southern from July 1870 until October 1872. Most of the labour was hired from South Australia.

The builders had cut and prepared over 36,000 poles weighing over 5,000 tonnes and carted them an average of twelve kilometres to the route of the line. They had imported a large number of iron poles from England (Oppenheimer telescopic) and carted these an average of 650 kilometres.

Oppenheimer poles are galvanised iron telegraph poles. They consist of three oval sections that collapse into each other telescope style for transportation. Once extended the joints between the sections are clamped with collars. The pole is fixed to a base for support with a u-bolt. They were originally used .in places where there was no suitable timber but when it became clear that wooden poles on the northern part of the line were going to be rapidly destroyed by termites and were vulnerable to fire, it was decided to construct the line with 3,000 metal

Wet batteries were used to power the repeater stations and the line.

The construction teams had transported over 2,000 tonnes of material into the Centre of Australia and had driven several thousand sheep and cattle over 2,000 kilometres from Port Augusta. They had cut and cleared tracks ten metres wide through about eight hundred kilometres of thick forest and scrub. They had taken a fleet of ships 145 kilometres up the Roper River. They had carted building materials, batteries, instruments and stores for the repeater stations, often with camels and 'Afghan' cameleers or by bullock dray or horse dray. They had built a twenty-two-room stone station at Port Darwin and other stone stations of seven or eight rooms at The Peake, Charlotte Waters, Alice Springs and Barrow Creek. They had built wooden stations at Tennant Creek, Powell Springs, Daly Waters and the Katherine. All in one year and eleven months.

Planning and constructing the telegraph

Todd became fascinated with telecommunications. In 1855 the South Australian government requested Sir George Airy, the astronomer royal, to select an observer and superintendent of electric telegraph at a salary of £400; he nominated Todd, who was appointed on 10 February. He reached Port Adelaide in the *Irene* on 4 November.

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Todd wanted to initiate plans for the connexion of Melbourne and Sydney by telegraph, followed by a link with England. In March 1856 he completed the first government telegraph between Adelaide and its port of Semaphore. He then told Governor Sir Richard MacDonnell that a line to Melbourne was of prime importance and that it should precede meteorological proposals. He went to Melbourne in July where he met Samuel W. McGowan, the Victorian superintendent, and commenced a lifelong friendship.

Both governments accepted their joint recommendation that the line should be laid down under one uniform and successful system (Morse's), that New South Wales be included, and that Australia be ultimately connected by telegraph to India: they had projected the first national communications system, one of the most significant colonial decisions of the century. Todd returned to survey the route of the 483 km (300 bns) section from the border to Adelaide. His success boosted his confidence and reputation and confirmed the governor's high opinion of his character, ability, and vision. In 1858 the government awarded him service pay of £1820.

Todd's meteorological plan, which he had submitted in 1856, depended on a network of observation stations which were required to report daily to the observatory. The telegraph system was the answer; he trained his own observers, including interested private individuals. Growth was slow initially and it was not until 1860 that the observatory was ready with the necessary instruments and fourteen selected stations. As the telegraph system expanded so did the meteorological stations, with a greater impetus ten years later when post offices came under Todd's control.

In England proposals for connexion with Australia by telegraph had been mooted in 1854 and the first plans were submitted to the colonies in 1858. The route was by India to Singapore and the Dutch islands to the north, by cable around the east coast to Brisbane and by landline to Sydney. The link depended on subsidies from the British and colonial governments and involved much complex negotiation. Todd, courteous and never contentious, examined every proposal and reported simply and lucidly.

John McDouall Stuart's crossing of the continent in 1862 proved the feasibility of the project but the discussions dragged on until 1863 and then lapsed. In Australia, the line from Adelaide to Melbourne was doubled, a direct line to Sydney with Todd as the chief negotiator was completed in 1866 and a line was run to Port Augusta which could be a starting point for extension west or north. In 1863 South Australia had gained control of the Northern Territory and suitable cable landing places there.

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1866 saw a resurgence of English proposals, and early in 1870 the British Australian Telegraph Co. planned to land a cable near Palmerston (Darwin) and connect to Queensland. On 1 January Todd became South Australia's postmaster-general and superintendent of telegraphs and revived an old scheme for a line to Perth and up the west coast but received little support. Then the company sought permission to land the cable, and Henry Bull Strangways, premier of South Australia, decided to build an overland line to Darwin, independent of other colonies, and the company accepted.

Todd was by now Head of the Electric Telegraph, Postmaster General, Government Electrician, and Colonial Timekeeper. Todd now produced a detailed organization, the result of years of practical experience. He had to build a line some 2897 kms (1800 miles), handicapped by lack of time and inadequate survey. He had to rely on Stuart's journals and maps for the greater part. But determined and confident, he divided the work into three sections: the southern and northern were let to contractors, each with one of Todd's overseers, the central was to be done by government labour under him. Having overcome initial difficulties of the passage of the MacDonnell Ranges early in 1871, he heard of disaster in the northern part: his overseer William McMinn mishandled the contractors, terminated their contract in May and returned to Adelaide. Work was practically at a standstill for five months.

The government sent Robert Patterson north with a relief party and Todd followed in January 1872. As work progressed, he went south inspecting the line, which was completed on 22 August, although cable communication was not made for another two months. 'This epic construction project provided one of the greatest advances in communications between England and Australia and the enthusiastic leadership of Charles Todd ‘must mark the Overland Telegraph Line as an outstanding example of engineering in Australia'. During the final difficult months, he proved his acumen in dealing with the captious and dissident Patterson. These two years were the peak of Todd's career and he achieved international recognition. One line remained to be built, that to Western Australia. By 1877 he had built his portion from Port Augusta to Eucla, the connexion being made at the end of the year.

In 1864 Todd had suspected the accuracy of the fixing of the 141 meridian boundary between South Australia and New South Wales; on completion of the Sydney line in 1866 he obtained agreement to check it. In 1868 with the co-operation of the observers of New South Wales and Victoria, he worked in the Sydney and Melbourne observatories and established a transit at the border to complete the operation. The solution agreed to by all was that the 141 meridian was 3.7kms (two and a third miles) to the east of the original boundary.

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The full development of Todd's beloved astronomy depended on the spread of the telegraphic network and the acquisition of modern instruments to provide a complete observatory. By the early 1880s he had organized constant general astronomical work, time services, a standard point for geodetic surveys, and gradual improvement in the accuracy of climatic statistics. He had been made a fellow of the Royal Astronomical Society in 1864. His meteorological system spread to all colonies and New Zealand. He sought systematic interchange of information and pioneered the production of weather maps. When he retired there were 510 rainfall stations in South Australia and the Northern Territory, twenty-two of which were completely equipped for all meteorological observations.

Todd attended an International Telegraphic Conference in Berlin in 1885. In 1889 he was elected a fellow of The Royal Society, London. These two distinctions gave him great personal satisfaction and by 1889 his salary was £1000. In June 1893 he was made a Knight Commander of the Order of St Michael and St George (KCMG). He was also a fellow of the Royal Meteorological Society and the Society of Electrical Engineers. In 1895 at the request of the Western Australian government, he chose a site and suggested the design and equipment for its new observatory, and his deputy was appointed government astronomer.

The technology that enabled undersea telegraphs

The Overland telegraph was connected to the rest of the world by undersea telegraphs.

The picture below illustrated the extent of Transatlantic telegraph cable and

submarine communications cables in 1891.

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Soon after the first successful telegraph systems were operational, the possibility of transmitting messages across the sea by way of submarine communications cables was first proposed.

One of the primary technical challenges was to sufficiently insulate the submarine cable to prevent the electric current from leaking out into the water. In 1842, a Scottish surgeon William Montgomerie introduced gutta-percha, the adhesive juice of the *Palaquium gutta* tree, to Europe. Michael Faraday and Wheatstone soon discovered the merits of gutta-percha as an insulator, and in 1845, the latter suggested that it should be employed to cover the wire which was proposed to be laid from Dover to Calais. Gutta-percha was used as insulation on a wire laid across the Rhine between Deutz and Cologne.

In 1847 John Watkins Brett, an engineer from Bristol, sought and obtained permission from King Louis-Philippe I to establish telegraphic communication between France and England. The first undersea cable was laid in 1850, connecting the two countries and was followed by connections to Ireland and the Low Countries.

In 1849, C. V. Walker, electrician to the South Eastern Railway, submerged a 3.2 km (2 mile) wire coated with gutta-percha off the coast from Folkestone, which was tested successfully.]

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The India rubber, Gutta Percha, and Telegraph Works

William Silver (from whom the RGSSA purchased its significant library in 1905) was involved in the development of telegraphic cabling through his manufacturing businesses in London UK.

in March 1864 announced the proposed formation of a separate company, Silver's India rubber Works and Telegraph Cable Company Ltd., that would incorporate Hancock's business. S.W. Silver & Co. would continue to be connected with the new one and it would use the works in Silvertown. By July, the name had become The India rubber, Gutta Percha and Telegraph Works Company.

A major change in the company's business was brought about by the development of telegraphy as means of communication over a distance by Morse and Steinheil in the 1830s. The primary requirement of this system was an insulated conductor connecting the instruments at each end. Hugh Adams Silver patented a method of winding India rubber around a cooper wire and then steam-heating it to fuse the winds into a continuous tube, which Silver & Co. started to advertise their 'Patent Caoutchouc Insulation for Telegraphic Cable' and 'Patent Caoutchouc Telegraphic Insulator' in 1858[1].

All underwater and underground cables manufactured between 1848 and 1863 were insulated with gutta-percha applied to copper wire using Hancock's patent wire-covering machine. In that time 23,860kms (14,826 miles) of submarine cable core had been insulated with gutta percha, for crossing the English Channel, the Irish Sea, the German Bight, the Norwegian fjords, the Mediterranean Sea, the Black Sea, the Nile, the Bosporus, the Straits of Messina, the Gulf of Canso (Nova Scotia), the Baltic Sea, the Danube, the Atlantic Ocean, the Red Sea, the Indus, the Adriatic Sea, and the Indian Ocean.

Later a second submarine cable between the same locations (Indonesia - Bali and Australia), was laid in 1880. When the East-West telegraph cable between Albany and Adelaide was completed in December 1877, Western Australia was first connected telegraphically with the rest of Australia and via the submarine cable at Darwin to the rest of the world.

[1] The site www.atlantic-cable.com is a mine of information on telegraphy generally, and submarine cables in particular. Material on the whole scope of the Silver businesses is available in Grace's Guide to British Industrial History at www.gracesguide.co.uk/S._W._Silver_and_Co.

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Due to frequent breaks in the Darwin – Banjoewangie [Bali] cables due to volcanic activity in the Timor Sea an urgent need arose to lay a third cable from Banjoewangie to Australia, away from the seismic zone. In fact a serious interruption occurred to the operating cable between Broome and Java at 3 .30 am [WA time] on Friday, 11 July 1890. This cable came ashore at Cable Beach, Western Australia. Tests showed that the rupture took place in the Bali Straits and was caused by violent volcanic disturbances. [Since the science of plate tectonics did not evolve until the mid 1960 's the planners could not have been expected to know that the security to be afforded by the new cable could not be permanent].

The Atlantic Telegraph Company

The Atlantic Telegraph Company was formed in London in 1856 to undertake to construct a commercial telegraph cable across the Atlantic Ocean. It was successfully completed on 18 July 1866 by the ship SS *Great Eastern*, captained by Sir James Anderson after many mishaps along the away. John Pender, one of the men on the *Great Eastern*, later founded several telecommunications companies primarily laying cables between Britain and Southeast Asia. Earlier transatlantic submarine cables installations were attempted in 1857, 1858 and 1865. The 1857 cable only operated intermittently for a few days or weeks before it failed. The study of underwater telegraph cables accelerated interest in mathematical analysis of very long transmission lines.

The telegraph lines from Britain to India were connected in 1870. (Those several companies combined to form the *Eastern Telegraph Company* in 1872.).

In 1862, Todd received samples of a new insulator he had invented from a Berlin pottery along with samples of a new article -- ebonite insulators, made from India rubber by Silver & Co.

The *HMS Challenger* expedition in 1873–1876 mapped the ocean floor for future underwater (submarine) telegraph cables.

Australia was first linked to the rest of the world in October 1872 by a submarine telegraph cable at Darwin. This brought news reports from the rest of the world. The telegraph across the Pacific was completed in 1902, finally encircling the world.

From the 1850s until well into the 20th century, British submarine cable systems dominated the world system. This was set out as a formal strategic goal, which became

known as the All Red Line. In 1896, there were thirty cable laying ships in the world and twenty-four of them 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 42.7 percent.

Telegraphy and longitude

The telegraph was very important for sending time signals to determine longitude, providing greater accuracy than previously available. Longitude was measured by comparing local time (for example local noon occurs when the sun is at its highest above the horizon) with absolute time (a time that is the same for an observer anywhere on earth). If the local times of two places differ by one hour, the difference in longitude between them is 15° (360°/24h). Before telegraphy, absolute time could be obtained from astronomical events, such as eclipses, occultations or lunar distances, or by transporting an accurate clock (a chronometer) from one location to the other.

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Sir Charles Todd - 1826–1910

Charles Todd was born on 7 July 1826 at Islington, London. He was an astronomer, meteorologist and electrical engineer, educated locally he was appointed to the Royal Observatory, Greenwich, as a supernumerary computer in 1841; he showed ability in mathematics and potential as an observer.

Prior to leaving England in 1855 Todd had married Alice Gillam Bell (d.1898) in 1855 in Cambridge, England. They had two sons and four daughters, a devoted family that also brought up two sons and a daughter of his eldest brother who died in 1861.

The Alice Springs telegraph repeater station in central Australia was named for Mrs Todd in 1871; the adjacent township of Stuart was re-named Alice Springs in 1933.

As junior assistant to Professor Challis at the Cambridge university observatory in 1848-54 he assisted in the determination of longitude between the Cambridge and Greenwich observatories by telegraphic means. Early in 1854 he returned to Greenwich as superintendent of the galvanic apparatus for the transmission of time signals. This involved close co-operation with the Electric Telegraph Co., and also with C. V. Walker, electrical engineer to the Southeastern Railway, who was one of the pioneer experimenters with submarine cables.

Todd held leading positions in numerous learned societies and educational and public institutions in the colony of South Australia. Much of the history of astronomy, meteorology and telegraphs in South Australia is contained in his reports to parliament between 1856 and 1900.

One of the founders in 1859 of the Brougham Place Congregational Church, North Adelaide, and of the Stow Memorial Congregational Church, Adelaide, in 1865, Todd and his family were regular worshippers. He died of gangrene on 29 January 1910 at Semaphore and was buried in the North Road cemetery. He was survived by one son and four daughters; Gwendoline married Professor Sir William Bragg of the University of Adelaide. Todd's estate was sworn for probate at £12,876.

Charles Todd and the Royal Geographical Society

Todd had a long connection with the (then) Royal Geographical Society and attended many meetings.

> The annual meeting of the Royal Geographical Society, South Australian branch, was held at the Arbitration Room, Marlborough Chambers, Wakefield

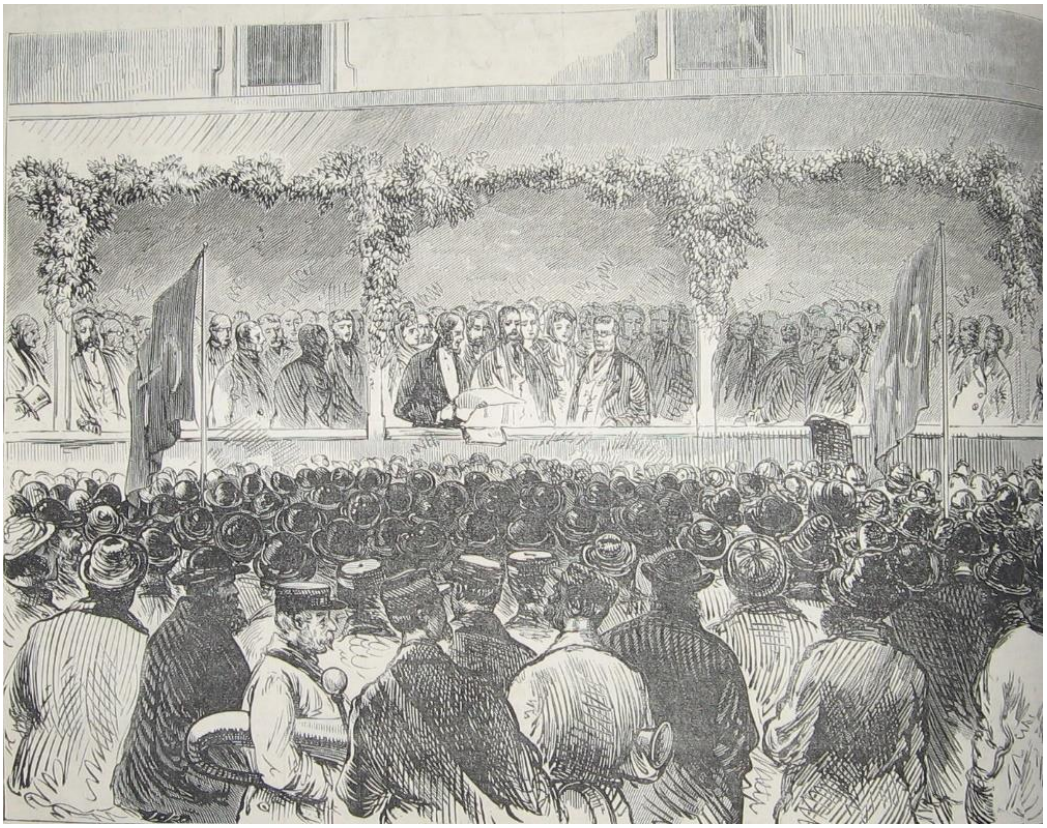
> Street, on Friday afternoon, May 27th, 1887. There was a good attendance, and the President (Sir Samuel Davenport) K.C.M.G.) took the chair.
>
> Lord Brassey was present by invitation and occupied a seat on the right of the Chairman.
>
> Among other gentlemen who attended were the acting Premier (Hon. J. C. Bray), Sir T, Elder, Sir Wm. Milne, The Postmaster General (Mr. Chas Todd C.M.G.[2]), and Dato J. Meldrum.
>
> On the walls of the room were displayed a collection of native wear.
>
> Mr. Todd, C.M.G., moved that the Hon. S. Tomkinson and Mr. Clement Sabine should be elected auditors. He felt great pleasure in the progress that the society had made. The initiatory meeting, although the proposal to establish the society fell through at the time, was held in his office. He was President of the Royal Society at the time, and he was asked to take the matter up. But at that time they were unable to start the society. He was glad to see that the institution had been started and was pleased to be a witness of its prosperity.

On July 6, 1888 Charles Todd attended the Annual meeting of the Society at their rooms on Grenfell Street:

> Sir Wm. Milne moved the appointment of the Hon. Dr Campbell, Mr. C. Todd C.M G. and Mr H. Newland, as members of the council. Mr. Everard seconded, and the motion was carried.
>
> Todd was one of a band of remarkable South Australians such as A.W. Dobbie, a versatile R G S member, delighted Adelaide with his electrical experiments; he introduced the telephone to South Australia, and Magarey was its first private subscriber. Charles Todd and W.H. Bragg set up a wireless transmitter at the Observatory in 1900.

[2] *In June 1883 the Geographical Society of Australasia was founded in Sydney. In the same year three of South Australia's leading citizens met to consider the formation of a South Australian branch. They met in the office of the Postmaster General, Charles Todd. Present were Todd, Sir Samuel Davenport and the Chief Justice, S.J. Way. They decided that "it would not be wise to establish a Geographical Society at that time, and that, if necessary, geography could be made one of the subsections of the Royal Society". Their decision was no doubt influenced by the smallness of Adelaide's population, an unfavourable economic climate, and the fact that the Royal Society, of which Todd was President, included in its interests geographical and allied topics. Whether there was room for the two societies was to remain a subject of debate for many years.*

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Charles Todd demonstrating the telegraphic communications system 1869.

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North Terrace, Adelaide
Phone 82077266
Email: Library@rgssa.org.au

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Essays and miscellaneous pieces

1

Author: Stephenson, Edward Rigby, 1847-1865.
Responsibility: by the late Edward R. Stephenson; with a preface by his friend C. Todd
Place: [Adelaide
Publisher: s.n.]
Date Published: 1865 (Adelaide: Andrews, Thomas and Clark)
Description: iv, 118 p. : ill. ; 19 cm.
Call Number: **rga 829.4 S836**

Summary: This volume elucidates the difficulties of colonization, and hence building infrastructure, in the northern Territory; and, on the importance of the acquisition of the Northern Territory to South Australia (a trade gateway to Asia). In 1862, John McDouall Stuart succeeded in traversing Central Australia from south to north. In 1863, the Northern Territory was annexed by South Australia by letters patent.

Reports on Overland Telegraph construction

2

Author: Todd, Charles, Sir, 1826-1910; Patterson, Robert C.
Corporate Author: South Australia. Parliament. House of Assembly
Place: [Adelaide
Publisher: Govt. Printer]
Date Published: 1872
Series: Parliamentary paper (South Australia. Parliament); 1872, no. 83
Description: 20 p. : 1 folded plan; 33 cm.
Call Number: **rgsp 919.423043 S726**
Notes: Ordered by the House of Assembly to be printed, May 2nd, 1872.

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Summary: "Copies of correspondence received from Charles Todd... and R.C. Patterson... relative to the progress made in the construction of the Northern Territory section of the Adelaide and Port Darwin Telegraph". Charles Todd was a champion of Federation for Australia.

Telegraphic communication with Western Australia

3

by:
- Barlee, F. P.
- Todd, Charles, Sir, 1826-1910.

Corporate Author: South Australia. Parliament. House of Assembly
Place: Adelaide
Publisher: [s.n.]
Date Published: 1873
Series: Parliamentary paper (South Australia. Parliament); 1873, no. 112
Description: 2 p. : map; 33 cm.
Call Number: rga 919.423043 W527

Summary: Western Australia's first telegraph line connected Perth and Fremantle in 1869. In 1874, the South Australian government received a second proposal from the Western Australian government and accepted by Charles Todd, South Australia's Superintendent of Telegraphs, as he decided it was necessary to their trade and commerce, navigation and defence. Both states passed bills approving the cost of the telegraph line's construction.

The Illustrated Melbourne post

4

Author: Illustrated Melbourne post (Tasmanian ed.)
Edition: Tasmanian ed.
Serial Numbering: -no. 117 (Dec. 7, 1868)
Place: Melbourne
Publisher: R. Stewart
Date Published: -1868

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Description: v. : ill. ; 43 cm.
Provenance: York Gate Library
Location: Cabinet 4 Shelf 1
Call Number: rgsp 079.94 I29 d
Subject: Melbourne (Vic.)--Periodicals; Tasmania--Periodicals
Australiana: Australiana
Notes: Provenance: York Gate Library. Caption title.
Description based on: No. 71 (Feb 18, 1865)

Summary: This informative publication began in 1862 and ceased in 1868. It contains not only contemporary written accounts of life in the Australian colonies, but supplementary lithographs as drawn images depicting those accounts.

Plan of Overland Telegraph from Port Darwin to Port Augusta [Plan of Overland Telegraph from Port Darwin to Katherine]

5

Author: Ringwood, Alexander
Crawford, Frazer S. (Frazer Smith), -1890.
Todd, Charles, Sir, 1826-1910
Responsibility: compiled and drawn in the office of the Postmaster General and Superintendent of Telegraphs by Alexander Ringwood; Frazer S. Crawford, Photo lithographer
Corporate Author: South Australia. Surveyor General's Office
Place: Adelaide
Publisher: Surveyor General's Office
Date Published: 1873-1874
Description: 1 map on 4 sheets; sheets 64.6 x 69.6 cm. or smaller
Map Data: Scale: [ca. 1:750 000]
Location: **Map Cabinet A Drawer 6**
Call Number: **809 gmh 1873/2**
RGSSA Holdings: Library holds sheet no.1 only (E129° - E133° / S12° - S15°)
Notes: Signature of Charles Todd, Postmaster-General, on each sheet. Each sheet numbered. Also available in an electronic version via the Internet.

World Connections 1872- Charles Todd and the Overland Telegraph

Summary: Map shows boundaries of counties and hundreds, telegraph line and notes and routes made by telegraph construction parties, etc. Relief shown by hachures.

Observatory and climate of South Australia
South Australia: its observatory and meteorology

6

Author: Todd, Charles, Sir, 1826-1910.
Responsibility: by Charles Todd
Place: Adelaide
Publisher: W.C. Cox, Government Printer
Date Published: 1876
Description: 38 p. ; 21 cm.
Call Number: **rgsp 551.699423 T633**
Subject: Adelaide Observatory; Meteorology--South Australia; South Australia--Climate
Notes: "From the Handbook of South Australia."
Caption title: South Australia: its observatory and meteorology.
Summary: Charles Todd was a trained meteorologist, astronomer and electrical engineer, appointed to the Royal Observatory, Greenwich, in 1841. As junior assistant to Professor Challis at the Cambridge university observatory in 1848-54 he assisted in the determination of longitude between the Cambridge and Greenwich observatories [England] by telegraphic means. Early in



1854 at Greenwich as superintendent of the galvanic apparatus for the transmission of time signals, he was involved in close co-operation with the Electric Telegraph Co., and also with C. V. Walker, electrical engineer to the Southeastern Railway, who was one of the pioneer experimenters with submarine cables. In 1855 the South Australian government requested Sir George Airy, the astronomer royal, to select an observer and superintendent of electric telegraph at a salary of £400; he nominated Todd, who was appointed on 10 February. He reached Port Adelaide in the *Irene* on 4 November.

Mr. J. Ross's explorations, 1874

7

Author: Ross, John, 1817-1903.
Place: [Adelaide
Publisher: Govt. Printer]
Date Published: 1875
Series: Parliamentary paper (South Australia. Parliament); 1875, no. 67
Description: 5 p., 1 folded leaf of plates: map; 34 cm.
Call Number: **rgsp 919.42043 G724 c rgsp 919.423043 S726**
Subject: Australia, Central--Discovery and exploration
Subject Refs: Central Australia
Australiana: Australiana
Notes: Caption title.

Summary: John Ross arrived in Sydney on 31 August 1837 in the *Earl Durham* and worked as a shepherd for George Macleay. In 1838 he joined Charles Bonney in the first cattle drive from the Goulburn River to Adelaide. In 1868-70 he worked for Thomas Elder and in 1869 took 30,000 sheep from his station, Umberatana, 300 miles (483 km) to the Macumba [was Treuer] River. Whilst there he explored

the Stevenson River to Eringa and Mount Humphries. He named mountains after his children, Sarah, Rebecca, Alexander and John; they remain on maps as a curious group of names in a remote and lonely region. Ross's recounted experiences led Elder to recommend him to Charles Todd who in July 1870 appointed him leader of the advance exploration party for the overland telegraph line to blaze a route with water and sufficient timber for the telegraph poles. He followed J. M. Stuart's tracks except through the MacDonnell Ranges.

Diary of J.M. Stuart's explorations 1860-61: northern exploring expedition under the command of John McDouall Stuart

8

Author: Stuart, John McDouall, 1815-1866.
Corporate Author: South Australia. Parliament
Place: [Adelaide
Publisher: Govt. Printer
Date Published: 1861]
Series: Parliamentary paper (South Australia. Parliament); 1861, no. 169
Description: 29 p. : folded maps; 33 cm.
Call Number: **rgsp 919.4043 M478 rgsp 919.42043 S931 rgsp 919.423043 S726**
Subject Refs: Central Australia Travelers' writings, Australian
Australiana: Australiana

Summary: This record was one of several presented to South Australian Parliament in 1858, 1862, 1861. At this time the middle of Australia (its Outback) was relatively unmapped. It had also not been crossed, Stuart was to achieve that in 1862/63, contemporaneously with Buke and Wills. It was thought there may be extensive grazing lands and minerals, that would be an economic boost for Parliament (and the Colony) at that time.

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J. M'Douall Stuart's explorations across the continent of Australia: with charts, 1861-62

Explorations across the continent of Australia

9

Author: Stuart, John McDouall, 1815-1866.
Place: Melbourne
Publisher: F. F. Bailliere
Date Published: 1863
Description: 97 p., [1] folded leaf of plate: map; 22 cm.
Call Number: **rgsp 919.40431 S931 rgsp 919.40431 E96**
Subject Refs: Travelers' writings, Australian Central Australia
Australiana: Australiana
Cited: Ferguson, 16380

Summary: Stuart has been described as Australia's greatest inland explorer. The noted latter day explorer and historian, Ernest Favenc, wrote: -

Stuart's victory was all his own; he had followed in no other persons footsteps: he had crossed the true centre, and he had made the coast at a point much further north than his rivals.

Stuart reserved an explorer's right to name the lands he found. He chose "Alexandra," but the name never came into common usage. (John McDouall Stuart Society, S.A.)

Reports on Overland Telegraph construction

10

Author: Todd, Charles, Sir, 1826-1910
Patterson, Robert C.
Corporate Author: South Australia. Parliament. House of Assembly
Place: [Adelaide
Publisher: Govt. Printer]
Date Published: 1872
Series: Parliamentary paper (South Australia. Parliament); 1872, no. 83
Description: 20 p. : 1 folded plan; 33 cm.
Call Number: rgsp 919.423043 S726

World Connections 1872- Charles Todd and the Overland Telegraph

Subject: Overland Telegraph Line (N.T. and S. Aust.)
Telecommunication--Australia
Subject Refs: Telecommunications
Australiana: Australiana
Notes: Ordered by the House of Assembly to be printed, May 2nd, 1872.

Summary: "Copies of correspondence received from Charles Todd... and R.C. Patterson... relative to the progress made in the construction of the Northern Territory section of the Adelaide and Port Darwin Telegraph".

The Darwin-Java cable was made and laid by the Telegraph Construction and Maintenance Company who had similar works to Silver's at Endersbys Wharf, East Greenwich.

Charles Hancock and the Silvers joined forces in the 1860s, pooling their expertise in working india rubber and gutta percha. Hancock and Stephen William Silver had a series of four patents sealed in December 1864. They covered electrical insulation, colour printing, and a new way of manufacturing flexible waterproof sheets. Hancock's address was then recorded as West Street, Smithfield. However, a prospectus in March 1864 announced the proposed formation of a separate company, Silver's India rubber Works and Telegraph Cable Company Ltd., that would incorporate Hancock's business. S.W. Silver & Co. would continue to be connected with the new one and it would use the works in Silvertown. By July, the name had become The India Rubber, Gutta Percha and Telegraph Works Company. Hancock brought his engineers and workmen with him, and the West Ham Gutta Percha Company ceased to exist.

All underwater and underground cables manufactured between 1848 and 1863 were insulated with gutta-percha applied to copper wire using Hancock's patent wire-covering machine.

The India Rubber, Gutta Percha and Telegraph Works Company, or the Silvertown Company, was in business until 1934, when it was taken over

by the British Goodrich Rubber, a subsidiary of the American B.F. Goodrich Company of Akron, Ohio. The company changed its name to the British Tyre and Rubber Company (later BTR Industries Ltd.) the following year after the American company sold out. They sold the Silvertown site for redevelopment in the 1960s. After a merger with Siebe in 1999, the company now trades at Invensys PLC.

Robert Charles Patterson (1844-1907), engineer, was born on 21 March 1844 in Melbourne. In 1871 Patterson was appointed to take over the trouble-ridden northern section of the Overland Telegraph Line. In a race against time, he met the same frustrations as his predecessors; the wet set in, but the line was completed—some eight and a half months late. In the circumstances no one could have done better. (ADB)

Plan shewing the Adelaide and Port Darwin telegraph line

11

Author: Crawford, Frazer S. (Frazer Smith), -1890.

Responsibility: compiled from official documents supplied by the Superintendent of Telegraphs; Surveyor General's Office Adelaide; Frazer S. Crawford, Photo-lithographer
Corporate Author: South Australia. Surveyor General's Office
Place: Adelaide
Publisher: Surveyor General's Office
Date Published: 1873
Description: 1 map: mounted on stiff paper; 92 x 43 cm
Map Data: Scale: [ca. 1: 2,500,000] (E129° - E139° / S12° - S33°)
Location: Map Cabinet A Drawer 6
Call Number: 809 gmh 1873/1

Subject Refs: Central Australia
Australiana: Australiana
Notes: Also available in an electronic version via the Internet.

World Connections 1872- Charles Todd and the Overland Telegraph

Summary: Map showing telegraph line, sections and stations. Relief shown by hachures and spot heights. "Country shewn between Lat. S 23 and 26 and Long. 129 and 135 is from Mr. Ernest Giles' Explorations 1872".

Ernest Giles (1835-1897) is among the more interesting Australian explorers by virtue of his journals which, although overwritten, display a fine descriptive ability and constitute a record of inner experience as well as outward observation. His culture, perception and imagination were no less marked than his skill and determination.

Giles succeeded in his cherished aim of making an overland crossing from South to Western Australia in 1875 three years after the Overland Telegraph was completed.

Giles Diary - Adelaide and Port Darwin telegraph line

(uncatalogued)

12

Christopher Giles (c1841-1917) arrived in South Australia in June 1849 at the age of about 9 aboard the ship *Calcutta* with his parents, Christopher Snr. (c. 1802-1884) and Hannah (née Tester, c. 1814-1900),

Summary: Christopher Giles (Jnr.) was a surveyor on the 1869-1870 expedition led by George Goyder, which completed a land survey of the Northern Territory and selected Palmerston as the site for the capital. Along with his younger brother Alfred he was



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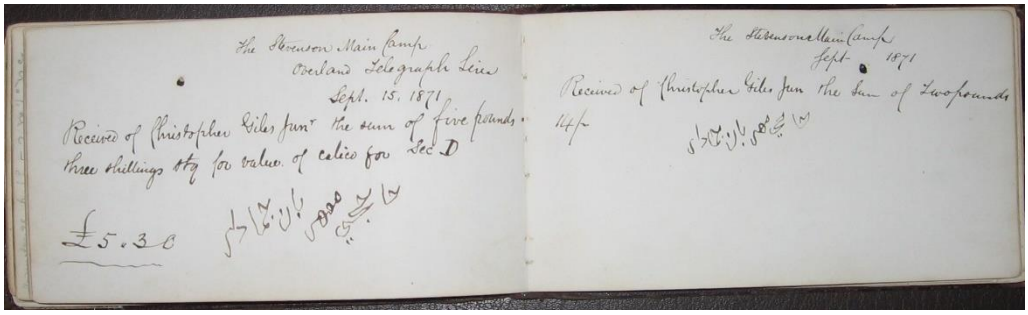
involved with the surveying of a route for and construction of an overland telegraph line between Adelaide and Darwin, which was completed on 22 August 1872. His younger brother accompanied explorer John Ross as together they mapped the route of the telegraph line's construction.

This diary has an account of the construction of a section of the Overland telegraph Line 1870-71

*Monday Nov 28 1870 Packed up and proceeded along the North back of Treuer [*Macumba River once known as **Treuer River**, is an ephemeral freshwater stream in the far north of South Australia, that is part of the Lake Eyre Basin], *to the junction of the Hamilton (creek) found the distance about 3 1/2 miles. camped near a long and deep waterhole on the upper Treuer about 1/4 mile above the actual junction. In afternoon I went out to examine the actual junction; the precise position of which it is not easy to determine on account of the width of the overflow of both channels. Cut near Mr Ross' recent outward tracks going N.W.*

Shot 3 pigeons while out, met with an old blackfellow on the Hamilton could make nothing of him. On return to camp I found a young native talking to Hanns, (This may be Albert Hous?), who gave his name as "Charlie Boy". He told us as well as we could make out of his broken English that Mr Ross has passed up a few days ago. That he had employed him to test the depth of the waterhole by diving and holding up his hands. He had also some notion of telegraph poles as he showed me several saplings and made signs where they would have to be cut down.

By 13 December Chris Giles was in charge at Charlotte Waters Central Construction team, (which as further subdivided in five sections), R.R. Knuckey having gone north.



The Diary has the signatures of some of the cameleers for supplies.

Todd Observatory marker excursion: 19th-21st April 1991

13

Responsibility: Royal Geographical Society of Australasia (S.A. Branch) Inc. in conjunction with the Institute of Surveyors, Australia (S.A. Div.)
Corporate Author: Royal Geographical Society of Australasia. South Australian Branch Institute of Surveyors, Australia (S.A. Division)
Place: [Adelaide]
Date Published: 1991
Description: 18 p. : ill., maps, ports; 30 cm.
Call Number: **rgpam 919.423 T635 b**



Summary: **In 1868 with the co-operation of the observers of New South Wales and Victoria, Charles Todd worked with the Sydney and Melbourne observatories and established a transit at the border to complete the operation**. The solution agreed to by all was that the 141 meridian was two and a third miles (3.7 km) to the east of the original boundary.

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In 1996 Society members attended the refurbishment of the observatory marker, built under the direction of Charles Todd that marks the border between N.S.W. and S.A. There had previously been state tensions over the Victoria and S.A. border, so Todd ensured by telegraphic means that this border was accurately marked. The Society also worked with the Institute of Spatial Sciences and the local Historical Society to bring this refurbishment project to a conclusion.

The marker by be accessed off the Old Wentworth Road about 40 km east from Renmark. The SA-NSW border time signals came from the Sydney and (ironically, given Victoria's attitude to the border) Melbourne Observatories -- this was 1869, before the OLT was completed

Transcription of copy of diary entries from April 12 1877 to November 3 1877 [manuscript]

14

Author: Ross, John, active 1877
Date Published: 1995
Description: 46 pages; 30 cm
Location: **MS Cabinets**
Call Number: **Ross, John (not catalogued yet)**
Subject Refs: Ross, John Diary Temora
Notes: Title supplied by cataloguer.
Summary: Entries start from Fullarton. Ross was at Temora from June 29 until August 30 and from there went south to Melbourne via Albury. A transcription of the original held in the Mortlock Library of South Australiana (PRG 404). Note at last entry 'For continuation of memos see other book which commences with 4 November 1877 South Terrace West. Mr. J. Ross'.
Cited: Not cited in printed catalogue

Summary: There is a filing cabinet drawer full of correspondence from Ross, copies, and on the Overland Telegraph route

and Construction notes. These complement the Symes papers on Charles Todd. There are around 20 files around 30 documents plus thick, with general subject headings, many transcribed from published sources, but, amongst the records are original correspondence on many aspects of the Telegraph exploratory routes and the people associated with the construction.

John Ross explored the Overland Telegraph route, based on the trek of John McDouall Stuart 1862/63. Ross worked for Thomas Elder and in 1869 took 30,000 sheep from his station, Umberatana, 300 miles (483 km) to the Macumba [was Treuer] River. Whilst there he explored the Stevenson River to Eringa. His knowledge of the country was very important to Todd as the route was planned.

Symes papers

15

Author: Symes, George W., (1896-1980)
Date Published: 1978
Description: 20 files indexed
Location: **MS Cabinets**
Call Number: **Todd, Charles (not catalogued yet)**
Subject Refs: Overland Telegraph construction, Adelaide Observatory discussion on transferring ownership in 1908 from the State to the Adelaide University.
Notes: Title supplied by cataloguer.
Summary: Major General G.W. Symes, who for many years was private Secretary to State Governors of S.A
Cited: Not cited in printed catalogue

World Connections 1872- Charles Todd and the Overland Telegraph

Summary: There is a filing cabinet drawer full of Overland Telegraph Construction notes, in around 20 files around 30 documents plus thick, with general subject headings, many transcribed from published sources, but, amongst the records are original correspondence on many aspects of the Telegraph exploratory routes and the people associated with the construction.

This material was gathered by Major General G.W. Symes, who for many years was private Secretary to State Governors of S.A. As a consequence, he was able to obtain access to many internal files easily. Unfortunately, Major General Symes, when retired, suffered a debilitating stroke before the information could be published.

Explorations in Central Australia of Goyder, Lewis, Ross, and others: bound collection of pamphlets

17

Author: Goyder, G. W. (George Woodroffe), 1826-1898
Lewis, J. W. (James Walton), 1841-1881
Ross, John, 1817-1903
Corporate Author: South Australia. Parliament
Date Published: [1857-1905]
Series: Parliamentary paper (South Australia. Parliament)
Description: 2 v. ; 34 cm.
Provenance: Ex libris Thomas Gill
Call Number: **rgsp 919.42043 G724 1857-1905**
Notes: Title supplied by cataloguer. Ex libris Thomas Gill.
Summary: Collection of Parliamentary papers and reports on exploration in Central Australia, by Goyder, Lewis, Ross and others, collected and bound by Thomas Gill. Explorations relevant to pastoralism and the Overland Telegraph line.

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These three men were instrumental in opening up the state of South Australia (colony) for pastoral expansion. **Goyde**r was the **State Surveyor General**, **Lewis** the **pastoral entrepreneur and (Federal) parliamentarian** and **Ross** the **consummate bushman** with an innate ability to **manage Outback logistics**.

These reports no doubt assisted the fledgling colonial government to embark on risk assessment of inland exploration and exploitation.

Clock - **Mortlock** [Jervois] **Wing**

Main Chamber



The big clock which looks down from the rails of the first gallery in the main chamber (reading room) was bought in 1866 by Charles Todd from Dent and Sons in the Strand, London. Todd an engineer and astronomer, chose a very accurate timepiece which could be synchronised with the [Adelaide] Observatory. It still keeps excellent time and is still mechanically wound.

Bridge, Carl, *A Trunkful of Books*, Libraries Board of S.A., 1985

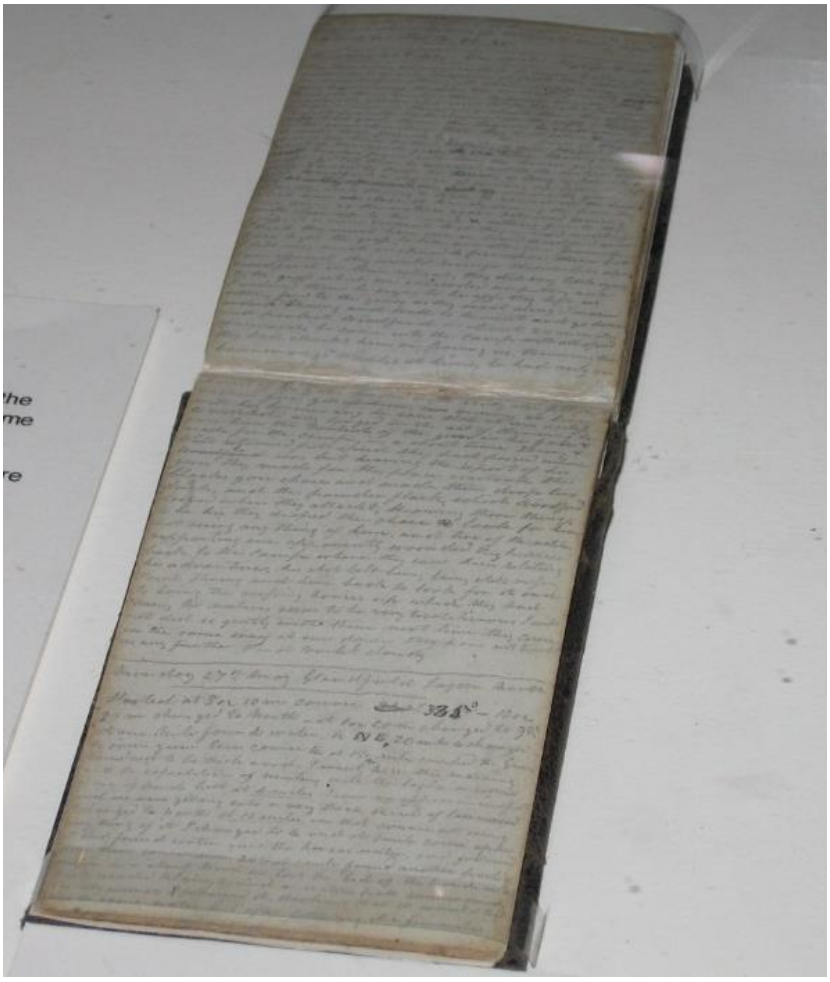
Summary: Balustrade mounted mechanical clock, 1866.

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Diaries [manuscript]

18

by: Stuart, John McDouall, 1815-1866
Place: Australia
Date Published: 29 Nov. 1860-3 July 1861, 4July-5 Sep. 1861.
Description: 2 vols.
Location: Rare Books Room
Call Number:
:



Summary: Two small leather-covered diaries in the collection are in the minuscule pencil hand of John McDouall Stuart. The diaries date from 29th November 1860 to 3rd July 1861 and again from the 4th July to the 5th September 1861and give accounts of his penultimate attempts to make the first crossing of the Australian continent.

World Connections 1872- Charles Todd and the Overland Telegraph

Stuart's routes eventually formed the route of the Overland Telegraph as Todd recognised that reliable supplies of water would be essential across Australia's arid centre.

McDouall Stuart was one of Australia's most successful explorers and his accounts of the mound springs as a reliable source of water influenced not only the construction of the Overland Telegraph by later, the railway between Port Augusta, Maree, Oodnadatta to Alice Springs.

Stuart was treated a bit parsimoniously by the State (colonial) Government after his successful crossing in 1863 but was awarded the Royal Geographical Society of London's Gold Medal for exploration in 1861.

He is buried at Kensal Green Cemetery in London, only a handful of mourners attended his family arranged funeral in 1866. This Society and the John McDouall Stuart Society were instrumental in obtaining Commonwealth Funding through the Significant Australians Project to completely restore the grave in London in 2011.

Estafette Bag [relic]

19

Place: Australia
Date: 1871-1872.
Description: Leather Bag with brass lock.
Location: Relic collection
Call Number: R 46

Summary: Tthe Estafette carried messages between the ever-closing ends of the constructed telegraph line until it was finally joined up in 1872; see the full record Biographical/historical information available

Hon. John Lewis, C.M.G., M.L.C., a past President 1913-20, and a member of the Legislative Council, who was keenly interested in land matters, particularly in the Northern Territory where, during the construction of

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the Overland Telegraph Line he ran a shuttle pony service carrying messages from the southern end of the under construction northern line to the northern most end of the under construction southern line. The Society has the original leather Estafette bag.

The construction of the northern section of the line was delayed during the 1871/72 Wet Season which was particularly heavy and Todd inspected the incomplete section between Elsey to Tennant Creek in July 1872, accompanied by Patterson.



In July 1872 Todd decided to institute a 'pony express' or horse relay in order to start and maintain telegraph operations across the gap between the two ends of the line. The first horse relay was over a distance of 421 km and was carried out by John Lewis and one of his men on 24 June 1872, arriving at Tennant Creek on 1 July 1872 . The horse relay was progressively reduced in length as the line was built. (Engineers Australia 2012)

Where did the line join? 30 km south of Dunmarra, Northern Territory.

The grid reference of the "joining pole" is: 16°55'20.4"S, 133°24'28.2"E

The grid reference of the obelisk on the Stuart Highway is: 16°55'18.2"S, 133°25'21.3"E

The grid reference of Frews Ponds is: 16°55'37.2"S, 133°21'52.2"E

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At anchor: a narrative of experiences afloat and ashore during the voyage of H.M.S. Challenger, from 1872 to 1876
Sketches from many shores visited by H.M.S. Challenger

20

Author: Wild, John James.
Responsibility: by John James Wild
Place: London
Publisher: M. Ward
Date Published: 1878
Description: 198 p., [14] leaves of plates: ill. (some col.), map, ports; 38 cm.
Call Number: **rgsp 910.41 W668 d**
Subject: Challenger (Ship) fl. 1872; Voyages around the world; Voyages and travels; Challenger Expedition (1872-1876)
Notes: Cover sub-title: Sketches from many shores visited by H.M.S. Challenger. Includes index. Ferguson no. 18556.

Summary: The *HMS Challenger* expedition in 1873–1876 mapped the ocean floor for future underwater telegraph cables.

Modern oceanography began with the Challenger Expedition between 1872 and 1876. It was the first expedition organized specifically to gather data on a wide range of ocean features, including ocean temperatures seawater chemistry, currents, marine life, and the geology of the seafloor. For the expedition, HMS Challenger, a British Navy corvette (a small warship) was converted into the first dedicated oceanographic ship with its own laboratories, microscopes and other scientific equipment onboard. The expedition was led by British naturalist John Murray and Scottish naturalist Charles Wyville Thompson.

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Many references in this Catalogue Publication are From Peter Taylor's book *An End to Silence*, in the Society's library published 1980.

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Time Line for Key Dates for the Overland Telegraph 71 (Engineers Australia)

8 June 1870	Port Augusta to Port Darwin Telegraph Bill introduced
16 June 1870	Bill received assent
7 July 1870	John Ross appointed to survey and plot the route from Mt Margaret
20 August 1870	Work team leaves Port Augusta by ship for Port Darwin
15 September 1870	First pole ceremoniously sunk at Port Darwin
March 1871	Torrential rain and supply problems interrupt work on the Northern section
August 1871	Patterson arrives in Port Darwin to resume work on the Northern section
August 1871	Telegraph Construction and Maintenance Company brings the undersea cable ashore at Port Darwin72
19 November 1871	Australia now linked to the rest of the world
1 January 1872	Penalties of 70 pounds apply for every day the transcontinental line is incomplete
21 January 1872	Charles Todd goes into the field to restart work from Roper River
April 1872	weather permits works to commence
22 May 1872	Todd sends first telegram across Australia from Port Darwin to a temporary station on Elsey River; then by horse to Tennant Creek; then by telegraphy to Adelaide
24 June 1912	Undersea cable between Port Darwin and Java fails
22 August 1872	Patterson joins the line near Frew's Ironstone Ponds
20 October 1872	Overseas line restored; Adelaide and hence Melbourne and the eastern states are now connected to the world
22 October 1872	First commercial message received followed by congratulatory messages from the Lord Mayor of London to the Mayor of Adelaide
15 November 1872	Celebratory dinners in Adelaide, Sydney, and London.