

# A TRIBUTE TO SURVEYORS / EXPLORERS OF 19<sup>TH</sup> CENTURY AUSTRALIA

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**Key words:** History, pioneering surveyors, exploration, Australia

## SUMMARY

You cannot assist in improving the situation for mankind without knowing where we have come from and how we evolved. This paper applies this to Surveying and exploring of Australia in the 1800's.

If we delve into how our pioneering Surveyors toiled and provided the valuable data required to open up the vast inland areas of this nation we can see that their great work ethic, endurance and sheer will-power to succeed set a bench mark and motivator for modern day Surveyors and spatial scientists to provide the ongoing building blocks of data collection and setout methodology necessary to meet the challenges of an ever evolving world.

If we don't know where we've come from we can't evolve and know where we want to go and how to get there. Our experiences (including mistakes) lay out the path for us to follow as we strive to produce a more sophisticated world in which to live.

As a fine example of the Surveying experience and the part it has played I provide here a tribute to the wonderful Australian pioneering Surveyors of the 19<sup>th</sup> Century by describing:-

- (a) The Surveying methods they used, developed and refined
- (b) The size and extents of their Surveys
- (c) The reasons the Surveys were undertaken and
- (d) The conditions under which these surveys were carried out

Through their great work and at times great sacrifice they blazed a "trail" that the rest of the nation was able to move along behind and quickly reap the economic benefits.

Originating from many parts of the world, including indigenous Australians, these pioneering spatial exponents have left a legacy of experiences for us to be inspired by as we continue the trail blazing now in a technological and innovative way such that society reaps the economic and environmental benefits to sustain itself and hopefully the world around it.

A cross section of pioneering Surveyors / Explorers will be examined and used to typify the personal sacrifices and experiences of the era.

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## 1. INTRODUCTION

The work and sacrifices of the Surveyors / Explorers during the 1800's allowed for Australia to expand its economic horizons. It provided the basis for opportunities for people to move from over crowded countries and re-establish themselves in areas where resources or environmental conditions made it suitable to enable them to 'carve out' a livelihood. Farming, mining and support services were able to flourish once these pioneers had mapped and described the areas they journeyed through. Other pioneering surveyors actually laid out the proposed routes for vital infrastructure across remote 'outback' areas not previously mapped.

These surveyors / explorers had varying backgrounds with some from the military; others were government employees whilst others were simply adventurers who were part of privately funded expeditions. Some parties surveyed across thousands of kilometres of land in extreme conditions of climate and terrain using traditional techniques which in some cases were modified to adapt to the conditions, size and value of the project.

Using observations to the sun and stars they were able to establish their location and map (with suitable descriptions,) the associated countryside.

They were a tough breed of human being and they needed to be. Let's raise our glasses to these wonderful pioneers who helped to lead people from many cultures into a more prosperous world.

People of future eras can learn and have learnt from their efforts. The remainder of this paper looks at the experiences of some of these pioneers. Hundreds of others in the period, whilst not mentioned, also put in substantial contributions and they are equally acknowledged.

## 2. SELECTED PIONEERING SURVEYORS / EXPLORERS

### 2.1 Matthew Flinders

Flinders was a naval officer and excellent navigator. He surveyed much of the Australian coastline in the period 1801 to 1803 using a sextant, chronometer, compass and other useful instruments and described, as he saw it, the nature of the coastal terrain.

The accuracy of the survey and usefulness of the information descriptions was such that some of his maps were still in use up until World War 2.

He was the first person to use the word Australia to describe the Great South land.

Considering his ship “The Investigator” generally “hugged” about 60% of the Australian coastline the danger of becoming another shipwreck statistic was quite high. However, his skill along with that of his crew ensured this did not happen.

His maps complemented the work of the others and provided a definitive boundary to a complete parcel of land the limits of which were used to control the explorations of others in the future such as Eyre.

His work also left a legacy of nautical accuracy to be used by ships navigators for decades to come.



1804 map by Matthew Flinders (Project Gutenberg Australia, 2010)

## 2.2 John Oxley / Thomas Mitchell / George Evans

Each of these pioneering surveyors held or acted as the New South Wales Surveyor General at periods during the early to mid 1800's. Evans also became the Surveyor General of Tasmania. They each carried out exploratory Surveys of various parts of NSW west of the Great Dividing Range with the aim of finding suitable land for farming, plus locating suitable lumbering areas and water ways (the life blood of existence in such a dry country.) These were the first inland surveys in Australia.



**John Oxley (Favenc 1908)**



**Thomas Mitchell  
(Universal Books  
No date)**



**George Evans  
(Weatherburn 2006)**

After Evans had carried out the first of these inland surveys in 1813 (reaching and mapping the Macquarie River), the Governor Lachlan Macquarie “predicted that the achievement would have momentous effects on the future prosperity of the colony” (Weatherburn 1966 and 2006)

Each of these Surveyors used various surveying instruments to obtain position data including, theodolites, circumferenter, compass, chains, steel bands and sextants. Often the location of various features was obtained by angular measurement.

Star and sun observations were used to obtain latitude, longitude, and orientation. They used log tables and slide rules and observations were recorded in notebooks. For the benefit of future users of their plans and maps the following information was recorded: - description of topography, type of tree cover and descriptions of fauna and flora, any evidence of minerals and encounters with indigenous people. Weather observations were also recorded and in some cases drawings of the terrain etc were carried out. (State Library of NSW, 2010). Evans and Mitchell were also excellent artists.

The expeditions to inland New South Wales consisted of a few men, often including indigenous Australians. They used horses, (sometimes carts) and often took along live sheep for food.

Given the unknown landscapes (with obviously no roads), and extremes of weather the expeditions found it extremely tough going.

The diary of George Evans in his exploration of the Lachlan River (Scott 2010) vividly describes the terrain and methods of observations used but equally describes the many problems faced such as losing horses, fatigue, wildly varying weather conditions and injuries. He also shows his compassion for the indigenous people.

John Oxley (in his diary of his 1817 expedition to extend the work of Evans and locate the extents of the Lachlan River in western NSW) described that :-

“Immense plains extended to the westward as far as the eye could reach. These plains were entirely barren...” and “Nothing can be more melancholy and irksome than travelling over wilds, which nature seems to have condemned to perpetual loneliness and desolation. We seem indeed the sole living creatures in those vast deserts” (Scott 2010.)

As with many Australian expeditions the expedition member numbers were reduced as the treks extended further into the uncharted wilderness to conserve supplies and allow smaller numbers to move further.

The diaries of Major Thomas Mitchell in 1836 indicate how he extended the survey and exploration of his predecessor’s further north west and south west along the Darling and Murray Rivers. In doing so he indicated that “I have always gladly adopted aboriginal names” (Scott 2010) in naming great natural features or new locations and must have consulted with the indigenous Australians to obtain this local knowledge.

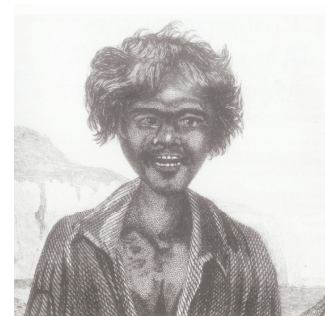
### 2.3 Charles Sturt / Edward John Eyre and Wylie



**Charles Sturt**  
(Universal Books,  
No Date)



**Edward John Eyre**  
(Dutton 1982)



**Wylie (Dutton 1982)**

Captain Sturt carried on the work of Oxley and Evans and located the large inland northern NSW river which he called the Darling in 1828/29 and subsequently located the Murray

River. His description of the land in the furthest most extremities of this expedition led to a colony being set up in South Australia. It was from this settlement (Adelaide) that led to many expeditions further west and north into the centre of the continent. (Scott 2010).

On subsequent expeditions he ventured further into the Australian interior looking for an inland sea in his great expedition of 1844 to 1846. This trek eventually took them close to the centre of Australia but they were forced back by the heat and lack of water.

His journal of this trek indicates he was accompanied on the expedition by a young Surveyor John McDouall Stuart (Refer 2.4) who used bearing and measured distance (and intersecting bearings) to locate features and set out a predetermined line to generally maintain an understanding of their location. This was checked from time to time by lunar observations (Scott 2010). His journal also indicates that he was most sympathetic to the indigenous people.

Sturt and his team suffered badly from the heat (up to 50°C), lack of water and lost a member of their team (Poole) to disease. He arrived back in Adelaide with the remaining cattle almost starved and him in a very weak state unable to ride. He had the sense to turn back when conditions were unfavorable. Others such as Ludwig Leichardt were not so fortunate.

- Edward John Eyre and his young indigenous associate Wylie managed to successfully undertake a mammoth trek from near Adelaide across the land north of the Great Australian Bight across to Albany in South Western Australia (well over 1200kms) in 1841 during the heat of summer.

The purpose of the trip (using pack horses only) was to try and discover land suitable for grazing stock and which might contain minerals and to find a suitable route to link Adelaide with the new colony on the Swan River (now Perth).

After a few weeks into the trip and with the extreme heat they soon used up much of their water. The horses had gone for 5 days without food or water (Dutton 1982). Provisions were also in short supply but Eyre was determined to continue onward.

When all their water was used up Eyre reverted to using a sponge and Wylie used a bark cup at dawn, to collect dew drops from grass and shrubs. As a last resort they dug in a hollow in the sand dunes (as recommended by local indigenous people) and eventually found sufficient water. Their food had run out hence they had to destroy the sickest of the remaining horses to survive.

Eventually after further trials and tribulations (including the murder of a member of the party and desertion by 2 others) Eyre and Wylie arrived in what is now the town of Esperance and eventually onto Albany.

Whilst the expedition was a failure in terms of economic development (Dutton 1982) it provided locations and data sufficient for others to know the dangers of the area. Its greatest

achievement was the survival story of Eyre and Wylie and the human nature story that evolved.

As an aside, the modern day transcontinental railway line runs close to the route of Eyres and Wylie's journey (Scott 2010).

Eyre later became the Governor of Jamaica.

## **2.4 John McDouall Stuart**

Stuart was the epitome of a dogged explorer who managed to survey a line from Adelaide to the northern Australian coast (near modern day Darwin) in 1862 across some of the worlds most barren and waterless terrain. His was a massive effort in a century of massive exploratory efforts.

The South Australian government sponsored his expedition which led to the survey of a route across the continent to be used for the overland telegraph. Following the laying of submarine cables etc to the northern Australian coastline this overland telegraph line finally provided a rapid communication link for Southern Australian colonies to Europe.

The Stuart survey and his descriptions provided excellent detail of the locations and nature of the terrain and vegetation. His expedition was done on horseback with quite a few party members, but the size of the party was important for the success of the project. Whilst a few horses perished on this trip the party managed to survive the lack of water, mosquitoes, scurvy and low food supplies to miraculously return to Adelaide as heroes.

Unfortunately the trip took a huge toll on Stuarts health and he was lucky to have survived. He had lost considerable sight in both eyes and lost a large amount of body weight and he never recovered his health and died a few years later (Favenc 1908). His was truly a great sacrifice.



**John McDouall Stuart (Favenc, 1908)**

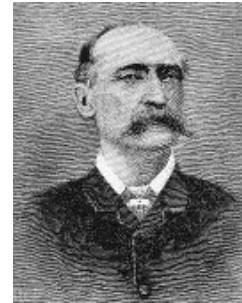
## 2.5 Ludwig Leichhardt / John Forrest / Ernest Giles



**Ludwig Leichhardt**  
(Favenc, 1908)



**John Forrest**  
(Favenc 1908)



**Ernest Giles**  
(Favenc 1908)

- Ludwig Leichhardt had a science (botany) background. He studied at Berlin University. In 1844-45 he led an expedition from South East Queensland across 4800 kms to near what is now Darwin in the Northern Territory.

His expedition party consisted of 9 men, 17 horses, 16 cattle, 4 dogs and meagre supply of provisions (Favenc 1908) the trek was funded privately. The 14 month journey resulted in the deaths of one of the men and number of horses and covered the exploration and naming of numerous rivers in Northern Queensland and the North Territory. Much grazing land was also discovered along the way which eventually led to the creation of many large cattle stations. At the end of such a large and arduous venture the members were exhausted and almost without provisions.

His second very ambitious exploration was to be a trek across Australia from East to West. The success of his first trek made it easy to obtain funding for this new expedition. This expedition set out in 1847. The first attempt failed so a second attempt was commenced with 6 men including 2 indigenous Australians, 50 bullocks, 20 mules and 7 horses (Tottenham 1987) plus provisions. All evidence of this party (including the animals) vanished after a few weeks and despite many search expeditions between 1852 and 1938 no trace was ever found of them (Tottenham 1987). They apparently all perished in the desert. They paid the ultimate sacrifice in the quest for knowledge.





**Typical barren inland landscape (Knowles, 1969)**

Ironically some of the search expeditions did find economically viable land and provided strong evidence that the value of much of the central part of Australia was dependent on seasonal variations. The great cattle and inland land owner of the late 1800's Sidney Kidman used these seasonal variations to advantage in building his 'empire.'

- John Forrest was a Western Australian Surveyor who successfully carried out exploratory and survey expeditions across the southern, middle and northern parts of Western Australia (from west to east) at times covering some of the most desolate country on earth. These expeditions were carried out between 1869 to 1874.

He used indigenous Australians as guides and was always well organized. His 1874 expedition into Central Australia was designed to cross the unknown country in central Western Australia separating the eastern and western colonies and looking for any reasonable land for the future grazing of stock. Initially they were successful but eventually they encountered the central desert but managed to find isolated water supplies (springs). This expedition linked to the western extents of a previous trek by Giles (Favenc 1908). Forrest expedition with other Surveyors in the Kimberley region (north Western Australia) described and mapped much more economically valuable land with the land being quite rich and with plenty of water (Favenc 1908).

Forrest later became the head (Premier) of the Western Australian Government a role he held for many years. The wealth of knowledge he would have gained from his expeditions would have been important in his role as leader of that state.

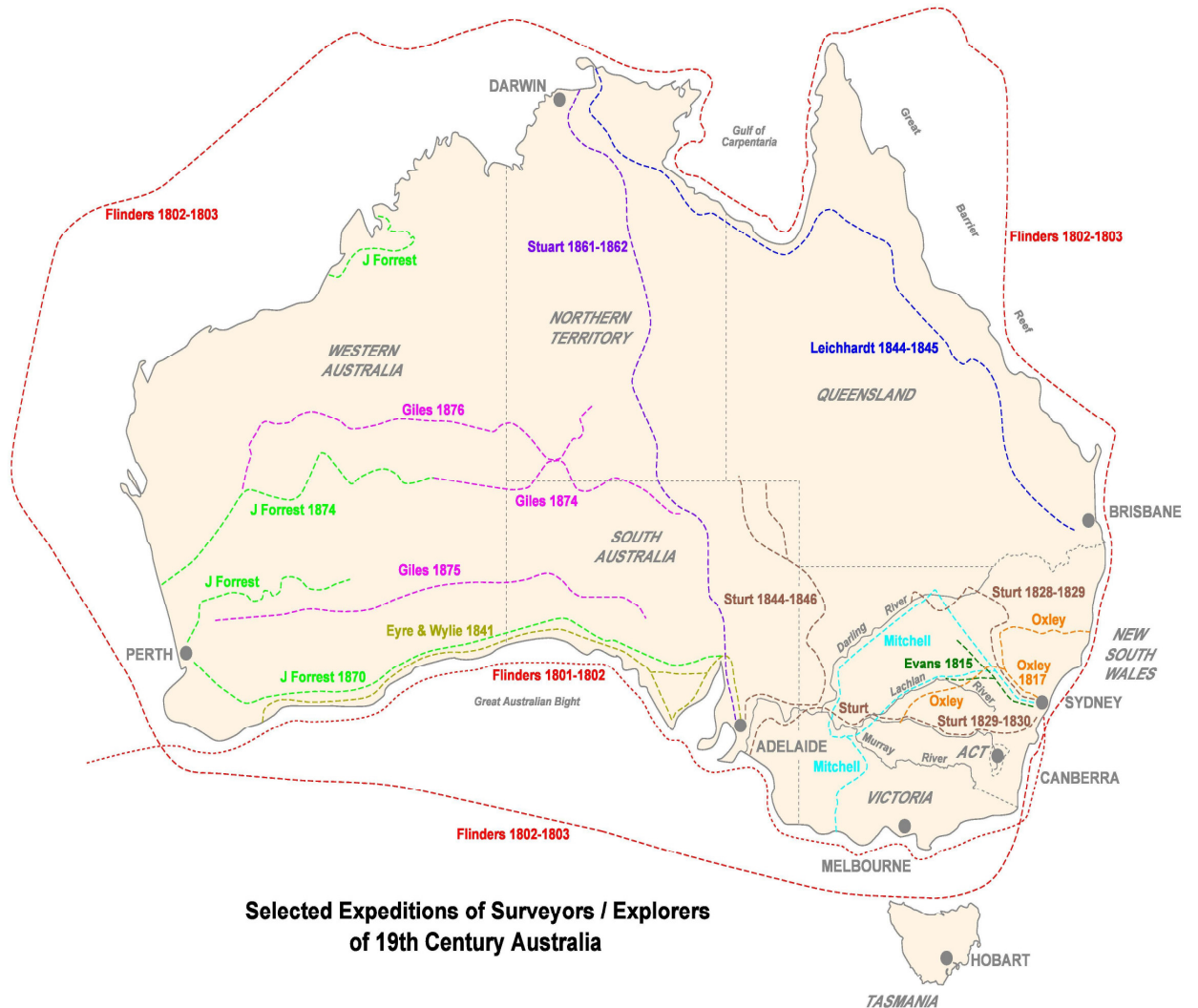
- Ernest Giles carried out various expeditions across Central Australia during the period 1872 to 1876. Based on the terrain he covered (once again some of the most desolate in the world) he must have truly been a tough individual.

His aim on these expeditions was to force his way across from east to west to link the eastern and western colonies. The expeditions were usually privately funded with the usual view to finding some economical benefit from the lands traversed and recorded.

In his 1875 expedition he had a well prepared team including indigenous Australians and consisting of camels for transportation. The expedition found a series of water springs and they successfully managed to trek across to the settled areas on the west coast.

## 2.6 Others

- Charles Tyers
- James Meehan
- Hamilton Hume
- William Light
- Burke and Wills (ill fated trek across the continent from south to north)
- Phillip Barker King (surveys of northern coasts of QLD and NT), completing gaps in Flinders charts of Australian coastline.
- Allan Cunningham
- Henry Hellyer (Surveyor who explored and mapped north west Tasmania in 1827)
- James Stirling (many surveys in Western Australia)
- E.Kennedy
- Warburton
- Gregory
- McKinlay



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## BIOGRAPHICAL NOTES



Graham Tweedie  
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Registered Land Surveyor NSW  
Bach of Surveying (Hons 1) University of Newcastle  
Member of Institution of Surveyors, NSW  
Member of Association of Consulting Surveyors, NSW  
Employed for many years with Aurecon (an international multi disciplinary consulting company). Provided Survey services to the Community Infrastructure, Transport, Buildings, Water, Energy, Mining and Industrial markets in Aurecons Asia Pacific Region and to many external clients.

Surveys of historical nature for Aurecon:-

- Survey of a World War 2 bunker under Regimental Square in the Sydney CBD
- Sydney University Survey (1840's plan overlay of current features)
- Surveys of Heritage Roads and Aboriginal Middens at Sydney's old Prince Henry Hospital site
- Survey of the old "Tank Stream" structures under Sydney CBD

Other surveys of note:-

- 1981 Survey to place the first pegs for the first structure (State Sports Centre) which became the initial part of redevelopment for the Sydney Olympic Precinct at Homebush.
- Aurecons control survey for Sydney Cross City Tunnel
- World Youth Day (Sydney 2008) sites set outs
- Major road and Railway topographic surveys in NSW

Other achievements:-

- Institution of Surveyors (Newcastle) student prize and offered scholarship to study/work in Florence, Italy
  - Finalist in the 2006 NSW Excellence in Surveying Awards
- Joint author of a document on the location of the historical garrison barracks (at present day Sydney University) used to house convict workers constructing Australia's first highway (Great Western) in the early 1800's.

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