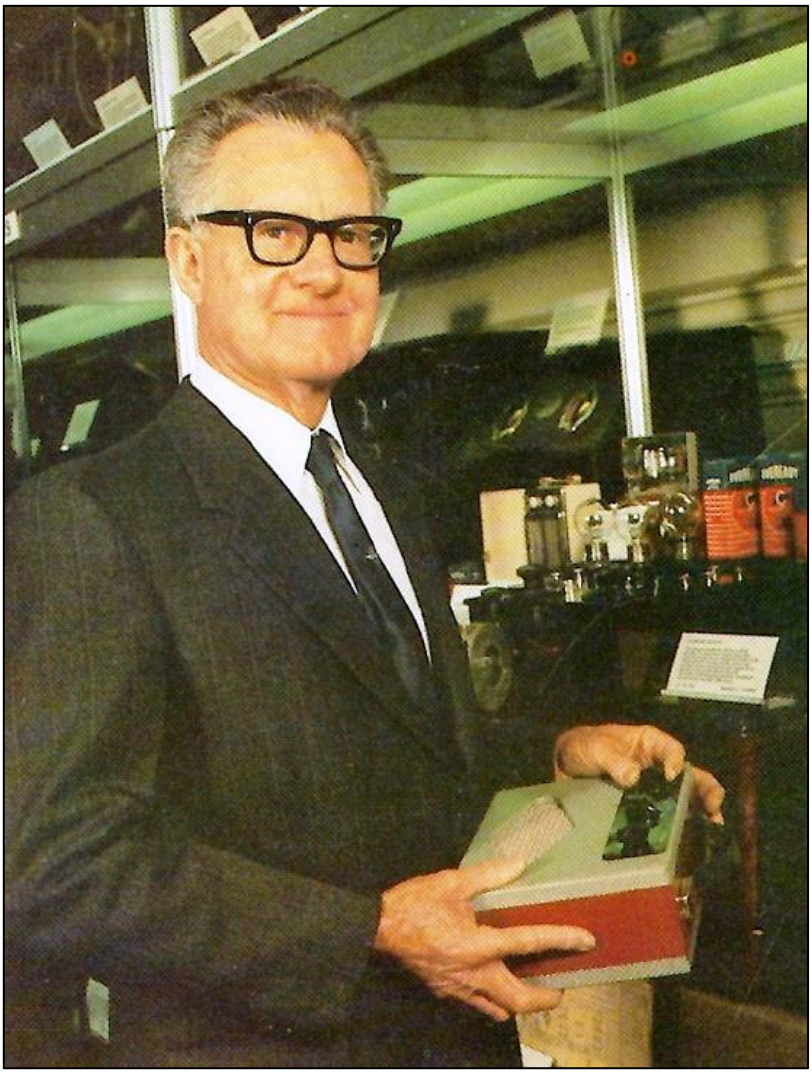
Engineering the airwaves – the life of Jack Ross AM



John W. Ross

Cover photograph:

Jack Ross at the opening of the Telecommunications Museum, Adelaide 1978 (Telecom Australia).

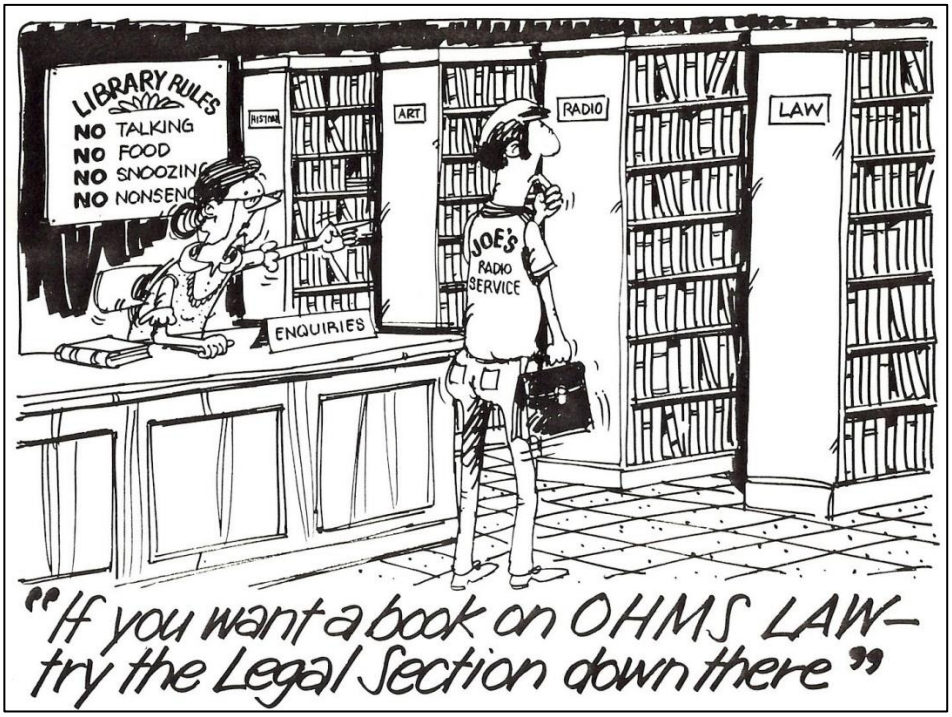


Figure 1 ***The Broadcaster*** **cartoon, July 1991**

Figure 2 ***The Broadcaster*** **cartoon, November 1990**

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Foreword

This is a biography of my father John Francis Ross (always known as Jack), an engineer and writer who lived through the Great Depression, World War II and an era of great technological change in his chosen field of radio broadcast engineering. After growing up in Brisbane and leaving school at fifteen to join the Post-Master General's Department, he set about acquiring the technical skills and experience to build a career in the rapidly developing world of radio. He began his technical training in the Royal Australian Air Force in 1941 where he had the opportunity to train as a radio mechanic and later to take part in the important but secret development of radar, which had a decisive impact in the defence of Australia.

After the war, he returned to his studies and qualified as an engineer in 1953, after which he worked throughout Queensland and Papua New Guinea on the installation and maintenance of the growing national network of ABC radio stations. This included regional short wave transmitters in Longreach and Townsville. He received a promotion in 1959 and moved to Adelaide, after which he was appointed project engineer on the large Radio Australia relay station project near Darwin. This station expanded Australia's voice in Asia until the destructive Cyclone Tracy damaged it severely in 1974. He then worked on its rehabilitation in the 1980s.

By the 1970s, Jack realised that the technology he had worked with early in his career was rapidly becoming obsolete and forgotten. He decided to write a number of books to record the history of radio broadcasting, in order to give future generations of technicians an appreciation of how modern technology had evolved from its pioneering days. In doing so, he became a highly respected authority on radio heritage, and by the 1980s was in great demand as a speaker at meetings, conferences and the important anniversaries of broadcasting, thus allowing him to take radio technology to the community.

After retiring in 1987, Jack moved to Port Macquarie and devoted much of his time to a lifelong interest in gardening, transforming his large block into a haven of palms and subtropical plants. He had started researching hydroponic cultivation in Adelaide, and continued this in retirement, publishing two books on the subject. But his magnum opus was a history of radio broadcasting in Australia from the first broadcasts in 1923 to 1998. Only someone who had worked so closely in the field for so long could have compiled such a comprehensive and detailed account of its seventy-five year span.

Jack's outstanding contribution to the field of broadcast engineering and the preservation of its heritage was recognised by a number of awards, principally as Member of the Order of Australia in 1989. He was also presented with the John Monash Medal in 2004 and the Australasian Sound Recordings Association Award for Excellence in 2009.

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Early years in Queensland (1922 to 1941)

The early development of Queensland

Queensland's early days of European settlement were spent as part of the Colony of New South Wales, administered by a series Governors based in Sydney. The Moreton Bay penal settlement, which would become Brisbane, was established in 1824 for the more intractable convicts. It operated until 1839 when it was disbanded, and this northern outpost of the colony moved towards free settlement.

As Queensland's economy grew in significance through the first half of the nineteenth century, a separate sense of identity emerged. Brisbane became a major urban centre, linked by land with pastoral producers in the hinterland, and by sea with markets in Sydney and London. The remoteness of the vast area north and west of Brisbane and a general disquiet with the neglect of public infrastructure led to a desire for independence from New South Wales.

By the end of the 1850s, Britain had agreed to the declaration of a new colony north of New South Wales, but there was much debate on where the border should be. Separation was declared in December 1859, and on Sydney's wish the border was set as far north as possible. Brisbane beat off Ipswich (the second town) and Cleveland to become the capital, resulting in a skewed state with the capital in the bottom south-east corner. Queen Victoria chose the name Queensland. The new colony was unique in the British Empire in being self-governed by a parliament with no experienced legislators, no imperial law enforcement (i.e. soldiers), and no imperial financial backing. The new governor, Sir George Bowen, hand-picked the first legislators before elections were held in 1860.

Much of the advancement of Queensland was by credit of its vast potential, being deemed one of the richest and most valuable of colonies. Life in these early days was hard for most people, with wages between 1854 and 1883 well below British wages. The economy was primarily wool, but also hides, tallow and meat. Most agriculture was maize and fodder, grown for the cattle and other animals. However, by 1880, minerals (mainly gold) and sugar rose in importance to diversify the economy.

In 1866, there was a major financial collapse, followed by a serious depression until 1871. After this, there was another serious depression from 1876 to 1880. However, there were gold rushes in the 1860s and 1870s, especially in Gympie (1868), Charters Towers (1871) and the Palmer River (1873), and these helped to protect the State from the effects of the economic downturns. The Charters Towers gold discovery in 1871 resulted in the richest veins of gold in the country with a grade nearly double that of the Victorian and Western Australian fields, and production reached its peak in 1899. After this, mining began to slow down and eventually ground to a halt in 1917[1].

Early Toowoomba

The first rudimentary settlement in the Darling Downs, about 130 kilometres west of Brisbane, was formed near the intersection of three pastoral runs and was named Drayton by a permanent settler named Thomas Alford, soon after his arrival in 1842. In 1852, he moved about 6 kilometres north-east to an area of marshland where permanent dampness was better than the dry spells in Drayton. The location had good market garden land and more passing traffic along a better track down the

Range to Brisbane. He named his residence Toowoomba, after an aboriginal expression used for the area.

Toowoomba's population expanded, and by 1876 it was described in the *Australian Handbook* as the principal town of the rich pastoral district called Darling Downs[2]. The first railway line in Queensland was opened between Ipswich and Grandchester in 1864, extending to Toowoomba in 1867. By 1949, population of Toowoomba had grown to about 40,000 and today it is nearly 142,000[3].

The Bryan family in Queensland

Jack's maternal grandmother Bridget Burke migrated from County Galway in Ireland to the Port of Maryborough in Queensland in the ship the *City of Agra*, departing London on 13 April 1876 and arriving on 14 July 1876[4]. She was accompanied by her parents John (aged 40) and Mary (aged 38) and her three brothers. The Burke family settled in Highfields, north of Toowoomba, and the father is listed in the electoral rolls from 1881 to 1885 in Highfields, then from 1886 to 1900 in Cock's (Railway) Camp, in Highfields Road[5]. This was a railway camp located just outside the Highfields village for some years.

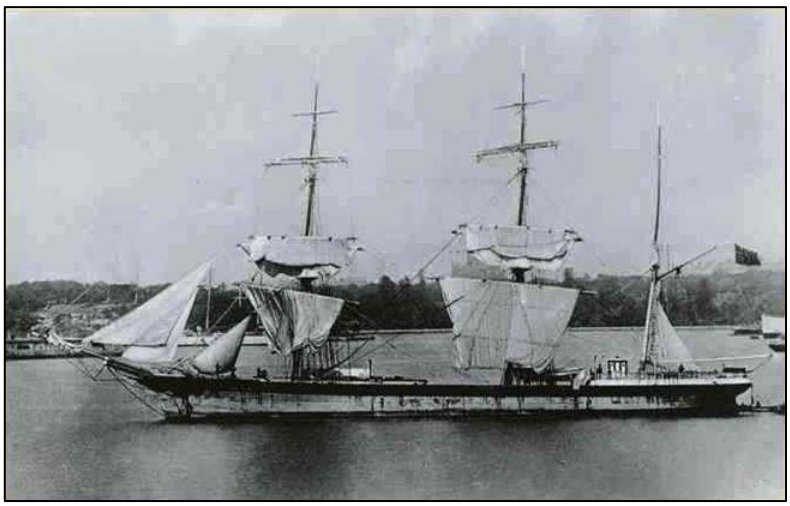

Figure 3 *City of Agra*, c1888 (State Library of South Australia)

Jack's maternal grandfather Henry Bryan was born in Bath in Gloucestershire in about 1869. It is not yet known when he migrated to Queensland, but in 1896 he was a farmer at Cambooya, a small town south of Toowoomba. By 1898, his occupation was listed as railway employee, and his address is also Cock's Camp, in Highfields Road[6]. There is no record of his parents living in Queensland, so he seems to have migrated as an unassisted single adult.

By the 1880s, economic booms were still short-lived: there were declines or slowdowns in 1880-81, the mid-1880s, then the terrible depression of the 1890s. Essentially, the Queensland economy had been unstable until this time, partly due to dependence on a few markets, all primary-based, and also due to heavy dependence on the vagaries of overseas capital for expensive infrastructure such as railways. Severe droughts lasting years cast a pall over the ongoing economy.

Queensland's pastoral industry was run by absentee landlords such as George Fairbairn of Melbourne, who owned 40% of the State's wool clip, and Sir Sidney Kidman, who was based in South Australia. A severe economic depression ran from 1891 to 1896, merging into the most disastrous

drought since European settlement, from 1898 to 1905. So there was a fifteen-year period from 1891 of depression or sluggish growth. By 1893, nine of the eleven banks or other financial institutions had failed, including the locally-owned Queensland National Bank.

These financial problems helped to fuel calls for a federal government to be formed with powers to govern currency and banking. The country became a federation of States on January 1st, 1901. From the Darling Downs came the writings of Arthur Hoey Davis (aka Steele Rudd), whose father Thomas Davis was transported as a convict in 1846. *On our Selection*, based on the challenges of life on a small farm near Drayton, was published in 1899.

Henry Bryan probably met Bridget Burke through his acquaintance with John Burke while both men were working for Queensland Railways in Highfields. Henry and Bridget were married at St Patrick's Roman Catholic Church, Toowoomba in 1896. Henry became a railway bridge carpenter, and later a bridge inspector.

Figure 4 Queensland railway fettlers, c1880 (Queensland State Archives)

Jack's mother, Nellie Mary Bryan (who is called Ellen Mary Bryan in her baptism record) was born in Spring Bluff, Highfields in 1897, eldest of seven children to Henry and Bridget Bryan. She studied nursing and lived in the family home in Alford Street Toowoomba until 1921, when she lodged at the house of Nurse Gray.

Jack recalled that she worked for some time at the Willowburn Mental Hospital in North Toowoomba. This hospital was a working farm with a large herd of jersey cattle as well as pigs, poultry and a vegetable garden. As part of their therapy, groups of patients worked in the gardens, feeding animals, stacking hay and delivering milk and produce[7]. Jack was born in December 1922[8] and baptised in the family church, St Patrick's Catholic Church (now St Patrick's Cathedral).

Cattle Country

In early 1923, Nellie decided to move with Jack to the cattle and sheep stations and work as a cook. The book *A Good Plain Cook* points out that cooking on cattle stations had its own set of challenges, as the more remote stations only killed an animal for food every few months. This gave a cook like Nellie the chance to show her ingenuity in making the meat last as long as possible (with no freezing and not much refrigeration) and in breaking up the monotony of eating what was essentially the one kind of food every day. After the cow or sheep was killed, the workers would have liver and bacon

for dinner that night, often with fried sweetbread. The next day, they would have brains and fresh (and therefore pretty tough) steaks for breakfast. After the animal was cut up, the cook would make a large quantity of strong stock and reduce it to an extract, to be used as the basis for a variety of soups[9].

Nellie met the drover Harold (or Henry) Edward Smithers and they were married in the St James Presbyterian Church at Charleville in February 1924. Smithers was born in London in 1903 and migrated with his family to Townsville in 1914[10]. Nellie and Harold were living at the Telegraph Hotel in Charleville when they were married[11], and in this town was a large coachworks for the stagecoach company Cobb & Co[12]. When Jack was older, Nellie used to tell him stories of the entertaining trips she took around Queensland in these famous coaches.

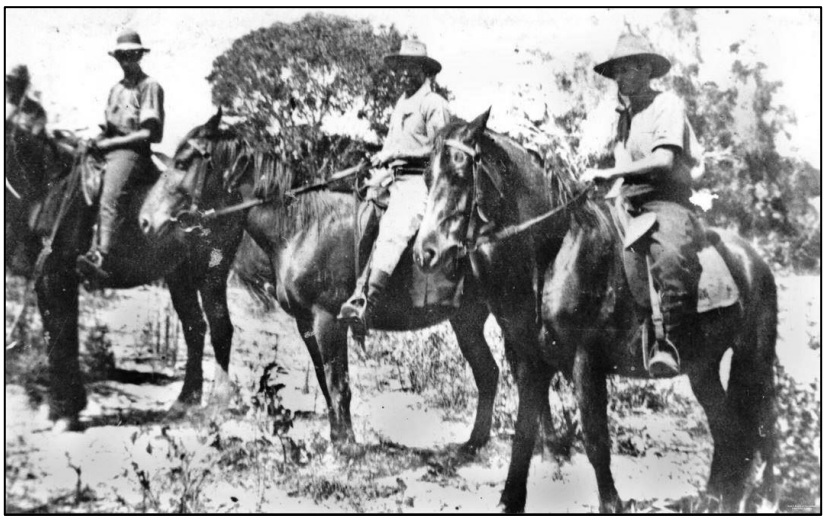

Figure 5 Stockmen, Cape York, c1920 (Slate Library of Queensland)

Nellie's movements around the cattle country are not clear because she always based herself in Toowoomba in the electoral rolls. By 1925, her nominated address was Redlands, the stately home of Edward Farmer and his family, a grazier with properties in the outback[13]. The family did not stay together for long, because Harold Smithers left, or at least he went off droving and did not return. He eventually reappeared in family history records in 1936, when he was living in northern New South Wales, still working as a drover[14]. He eventually settled in Tamworth, where he died in 1981[15].

In about 1925, Nellie met the drover Walter (Wally) Ross and they started a relationship. Wally was 41 by then, and had already had an active life. He was born in Brisbane in 1884 to Thomas and Margaret Ross. His father was originally named John Le Gros when he had three children in Melbourne to Margaret Tacey (or Tracey), George (1876), John (1877) and Margaret (1880). When he moved to Brisbane with his family in about 1883[16], he started calling himself Thomas Ross, Thomas Ross worked in Brisbane as a labourer and the couple had two more children, Clara (1885) and Alexander (1886)[17]. He died in 1937 and is buried in the old Toowong Cemetery[18].

Wally worked in the northern Queensland town of Charters Towers from 1905 to 1916[19], then moved back with his parents in 1917. It was likely he had been trying his luck in the goldfields around the town, but gave it away when the gold ran out. From 1922, he spent several years as a contract drover in the western part of the State, moving herds of cattle between the pastoral stations and to market. Initially, he was based in Cloncurry in 1922[20], about 120 kilometres east of

Mount Isa in the State's north-west. This was the centre of a major copper mining area in the late nineteenth century, and was also a large cattle-rearing district. However, *The Brisbane Courier* reported in June 1922 that:

> "From 1914 to 1920 in particular, Cloncurry was a prosperous place, due to the high prices of copper, cattle and station products such as wool. Owing to the present slump, however, the district is feeling the pinch severely"[21].

By late 1925, Wally was based at the large Strathdarr Station, about 50 kilometres north of Longreach[22]. This town is on the Thompson River, which runs southwards into Coopers Creek. Along with the Diamantina and Barcoo Rivers, these great waterways form much of the vast floodplains known as the Channel Country. Most of the time this area is dry, but after occasional heavy rain, the flooded rivers can be up to 80 kilometres wide as floodwaters make their way through south-west Queensland and into the Lake Eyre basin. Large numbers of cattle and sheep were moved down from the pastoral stations such as those of the "Cattle King" Sidney Kidman (1857-1935) to the railhead at Maree in South Australia for transport to markets further south.

After Kidman died in 1935, Jack was reading a newspaper article about his life, and when Wally saw the article, he said:

> "I worked for Kidman shifting cattle all over the place. He was a good man and paid his drovers good wages. He paid me on contract – so much for each beast. But he deducted money for any that died, so we were careful to look after them. Calves born during the trip were always a problem."

Figure 6 Apex Super Five radio (Harvard University collection)

Kidman occasionally sent Wally to Brisbane to buy saddles and other stores, and it was while he was there that he heard wireless broadcasting for the first time, and thought it would be good to listen to the programs on his droving trips. This must have been in the late 1920s when radio was becoming popular in Queensland. Jack believed Wally bought an Apex Super Five 5-valve radio receiver from the Trackson Brothers shop in Brisbane, and a supply of batteries to last a droving trip. He became adept at stringing up the wire antenna each night when he made camp, and was able to use his expertise to help a few homesteaders he came across to set up their own antennas and to tune their new receivers to Queensland and interstate stations.

Wally became a great ambassador for the benefits of listening to the wireless and would impress the residents of homesteads where he stopped for the night by tuning in to educational and musical programs each night. Many years later, Phil Trackson from the radio shop told him that he received a steady stream of orders from people living in western Queensland as a result of Wally's recommendation, and that this influenced the subsequent establishment of broadcasting stations in Charleville and Longreach[23].

Brisbane and the Great Depression

In mid-1926, Nellie, Wally, Jack and his sister Joyce moved in to Roma Cottage, Flinders Parade, in the outer Brisbane suburb of Sandgate[24]. Even though Nellie's husband had disappeared, as a Roman Catholic she would know that her church frowned on divorce and would not allow her to remarry in a Catholic church if she obtained a legal divorce from Harold Smithers on the grounds of desertion. So she never divorced him and remained Mary Ellen Smithers[25], However, they lived in Brisbane as if they were a married couple, and to everyone's knowledge, Nellie was Mrs Ross. Between 1939 and 1950, she is listed as Mary Ellen Ross in the electoral rolls, then as Nellie Mary Ross from 1952 onwards[26].

Valma Margaret (1926-2015) was their first child together, born in Sandgate. Other children were Bryan Walter (born 1929), Marcel Jules (1931-2011), who later changed his name to Martin, and Marilyn Lathe (c1935-1944). In about 1928, Wally and Nellie bought an empty block in Milton Road, Banyo (now called Radley Street, Virginia). When they moved there, Wally built a two-roomed shed at the back of the block using kerosene tins that had been cut open and flattened out. The shed had a wooden floor and sheets of galvanised iron on the roof and the family lived in this shed until a house was built.

Figure 7 "Minuit", Radley Street, Virginia

Wally erected a large Queenslander house, and while it was being built he would often work on it late into the night. Radley Street was a lovers' lane at the time, and couples walking past at night would ask him why he was working on the house so late. He used to tell them that it was his "midnight house", so he decided to name it "Minuit", the French word for "Midnight", in

commemoration of his French Canadian heritage. He paid five shillings to have a sign made, and mounted it on the front of the house. There was a farm on one side, an empty block on the other, and a creek running along the back. Years later, a share farmer lived in the tin shed while he worked the nearby farm. He taught Jack how to play the mouth organ. The shed was later expanded and used by Joyce's husband, Frank (Digger) Kennedy, as a garage for his motor repair business after they built their own house on the block next to Wally and Nellie.

One of Wally's skills was leatherwork. He probably learned this while working at the cattle stations, where cow hide would have been widely used. Jack remembers that Wally made a school bag for him, and that this lasted many years. He also fashioned a triangular leather bag that fitted inside his bicycle frame, and which was used to carry his lunch box, thermos flask, and other odds and ends[27].

The post-World War I period was difficult in Queensland. Unemployment was up to 22% during a multinational recession in 1921-2, higher than during the later Depression of the 1930s. Queensland still depended on investment from London, and this plummeted during this time. A severe drought from 1926 meant that Queensland was already moving towards depression in 1928 in the lead up to the worldwide Depression that was triggered by the New York stock market crash in October 1929. Unemployment in Queensland peaked at 19% in 1932, promoting the Queensland government to initiate an economic recovery program, similar to the American New Deal a year later[28].

Figure 8 Nellie Ross at Virginia

During the years of the Great Depression of the 1930s, many people supplemented their income by growing and selling fruit and vegetables. Wally's family did this by gardening in the back yard of the house. Wally used to plough the yard every two years before planting a new crop of tomatoes, strawberries and other vegetables. He made the leather fittings for the plough, as well as the harness and other leatherwork for a sulky and a horse-drawn wagon. Jack remembers that every Saturday, the strawberries and vegetables were piled up on the wagon, and were taken in to Virginia

where Wally had a number of regular customers. Orders were taken during the week, and on Saturday morning Nellie would have the produce packed and ready for delivery.

As a trained nurse, Nellie had a good knowledge of medicines, and used to create her own potions and ointments. Jack remembered one that was made from prickly pear leaves, and which the kids didn't mind taking, as it had a very good taste. Nellie also helped the neighbours with first aid when required. On one occasion, Mrs Fraser, who lived on a small farm across the road, cut her leg badly on a sheet of iron. Her son, Geoffrey, who was two years older than Jack, came running up the stairs calling out "Mrs Ross, come quickly, Mum cut her leg and blood is spurting everywhere!". Nellie rushed into the lounge room, picked up the fibre case she called the "Medicine Chest", and ran over to the neighbour's, followed by Geoffrey and Jack. The floor of the house was splattered with blood, but Nellie knew how to handle the situation, and soon had the leg cleaned and bandaged, and gave Mrs Fraser some medicine out of a bottle. She went back the next day to check on her patient, but no more was heard of the incident, so the neighbour must have recovered satisfactorily.

Jack remembers there were no commercially-produced medicines in the house during this time, only a wide range of home-made concoctions for almost every ailment. Each bottle had a simple white sticker labelled something like "Nellie's Home Made Medicine – Guaranteed to Work", in her perfectly-formed copperplate handwriting. When Wally made a delivery at a customer's house, he would take two baskets into the house: one with fruit and vegetables, and the other with bottles of Nellie's home-made medicine.

Each year, a commercial traveller used to call by the house in Banyo in a horse-drawn wagon loaded up with all sorts of household goods, including rolls of dressmaking cloth and medicines. On one of these visits, he and Nellie had a long discussion about the merits of the commercially-made medicines he had in his stock. Nellie must have made a pretty good sales pitch and convinced him that her home-made medicines were superior to his, as Jack saw her give him half a dozen bottles in exchange for a ten shilling note. Wally couldn't believe it that night when she told him how she'd managed to outsell a professional salesman.

At some point in the early 1930s, Wally gave up droving and became a ganger (a foreman) in charge of a group of about twenty men working on road-building and maintenance. At one time he managed one of the unemployment relief programs run by the government to keep men in part-time work during a time of very high unemployment. Both work and goods were rationed in those days to try and ensure that as many people as possible were able to get by until the economy improved. As far as Jack could recall, a single man would be rationed to one day's work a week, a married man was allocated two days' work a week, and an extra half-day for each dependent child. Part of the wage was paid in ration cards, which were taken to welfare centres or police stations to exchange for food, clothing and other essentials.

Part of Wally's job as a ganger was to fill out work cards every night for each man who had worked that day. He would do this on the dining table where Jack was doing his homework, and he remembered Wally remarking on the great variety of qualifications in his work gang: there was a doctor, a butcher, some bakers, a car mechanic and a few school teachers. Life was tough for all walks of life in those days[29].

Starting a career with the PMG

Jack attended Boondall State School from 1928 until 1936, passing Scholarship (the end of primary education) and Junior levels (second year high school). He went to Nundah State School for a year in 1937. Jack was a keen sportsman who played cricket in summer and rugby league in winter. He told me that as a schoolboy he played against the future Test cricket all-rounder Ken Mackay (1925-1982). Mackay, who played for the neighbouring Virginia State School, was widely known as "Slasher", an ironic nickname based on his highly defensive but effective batting style[30].

Jack was also a good footballer, and was selected in a Brisbane schoolboys' rugby league team that travelled to Rockhampton in August 1937 to play a representative selection of local players[31]. Towards the end of 1937, he submitted applications to join either Queensland Railways or the Post Master General's Department (PMG). His mother hoped he would join the railways, where her father Henry and brother Bill both worked, but an offer from the PMG arrived first, and Jack accepted that.

To complete his application to join the PMG, Jack needed a birth certificate to formally establish his identity. He'd always assumed Wally was his father, as he had grown up knowing only him as Nellie's partner. Wally knew this was a problem, because Jack's birth surname was Bryan, not Ross as he had been calling himself. So Wally took him to a solicitor's office, and they signed a few forms there. Jack didn't understand the purpose of the forms, but he later found out that he had walked in as John Francis Bryan and walked out as John Francis Ross.

Figure 9 Sandgate Post Office (Wikipedia)

A birth certificate turned up in his new name[32]. This was no surprise to Jack, who always thought that was his name, and it was only in the early 1980s (after his mother died) that he was told that Wally had formally adopted him as his son at the meeting with the solicitor. This legitimised the story Wally and Nellie had told everyone, which was that Jack and Joyce were the children of both of them. Wally didn't adopt Joyce, although her surname was always given as Ross, and she always thought that this was her correct name. Legally, she was Joyce Eileen Smithers, and was baptised with this name in the St Patrick's Catholic Church, Toowoomba[33].

Jack was appointed to be a telegraph messenger at the Sandgate Post Office in January 1938[34]. Much of his time was spent cycling around the area delivering telegrams. The one brush with fame he remembered was handing over a telegram to John Bradfield, who gave Jack a sixpence for his service. Bradfield designed and oversaw the building of the Sydney Harbour Bridge, and later designed and built the Storey Bridge in Brisbane. In September 1938, a letter from the Deputy Director of Posts and Telegraphs reviewing Jack's progress mentioned that he took an active interest in his work and was a credit to the service. The Deputy Director recommended a course of study to ensure his future progress and promotion in the Department[35].

Responding to this encouragement, in March 1939 Jack was one of the first students to enrol in the newly-established Australian Radio Engineering Academy in Brisbane. His recollection many years later was that this was in 1938, but the academy first advertised its courses in March 1939[36]. He probably took a correspondence course, studying part-time while working full time at the PMG. This began a pattern of work and study that Jack was to follow for many years to further his knowledge and career.

In March 1941, Jack commenced work as a telephonist in the PMG's Department in Brisbane[37]. It seems he always wanted to work in a technical field, and this appointment gave him his first experience of electrical equipment, as he worked with both manual and automatic telephone exchanges. Then in September 1941 he was granted indefinite leave from the PMG to enlist in the Royal Australian Air Force (RAAF)[38].

His application for enlistment in July 1941 stated that he wanted to become a Radio Mechanic in the RAAF[39]. I think he decided to enlist in this service partly out of patriotism to serve his country but also because the Air Force provided training in the field of radio and telecommunications, an area that Jack was very interested in by then.

Radio broadcasting began between the world wars, with the first stations in Queensland operating in 1925. It proved to be very popular, and by the time the ABC started in 1932 there were 55 stations and 370,000 receivers in the country, with the number of receivers doubling in three years. Sports lovers were especially well catered for with ball-by-ball cricket descriptions from England sent to Australia by frequent cables and turned into lively commentary by a local announcer, including sound effects. Some people reportedly tuned in just for the sound effects. It is likely that by 1941, Jack saw his future as an engineer in this field.

Wartime (1941 – 1945)

War in the Pacific

The Japanese Air Force attack on the American base at Pearl Harbour in December 1941 brought the countries of the Pacific region into World War II, which until then had been fought in North Africa, the Middle East and Europe. Australia was directly affected from February 1942 when 17,000 Australian troops became prisoners of war after the landing of Japanese troops in Singapore. Beginning the same month, air raids on Darwin sank or damaged 230 ships, killing 250 people. Panic and mass evacuation resulted. Other centres were bombed: Broome, Derby, and Katherine in March, then Townsville in July.

However, the Japanese were thwarted in attempts to take Port Moresby by sea (in the Battle of the Coral Sea) and land (being beaten back along the Kokoda Track after a long campaign by Australian and American troops). Queensland was not under direct threat of invasion, as it was later found, but the inhabitants were understandably feeling extremely vulnerable. The State became the Allied staging zone for the defence of the south west Pacific region.

From the start of World War II in September 1939 until December 1941, Queenslanders thought of the war as a repetition of World War I - a long way away. However, the start of the Pacific War quickly galvanised the public mood. For four years from 1941, nearly two million servicemen entered Queensland, mostly from United States. Brisbane's population was 340,000 in 1941, and it hosted much of this American presence. General Douglas Macarthur and General Thomas Blamey had their Command Headquarters there, and nearly 80.000 GIs were based in Brisbane at the peak of the war.

Radar - the Allies' secret weapon

Early in World War II, Australia's scientific community rallied to the Allied cause. Some areas of research in particular became vital to the war effort, and one of these was radar. The Council for Scientific and Industrial Research (CSIR, later CSIRO) quickly set up a Radiophysics Division, housed at the University of Sydney from early 1940.

Following an invitation from the British Government in 1939 to share the secret information on the technique of using radio waves to detect aircraft and ships (later called radar) with its wartime allies, documentation and equipment were brought to Australia from the United Kingdom by the radiophysicist Dr. David Forbes Martyn. The Division used the equipment and associated engineering information to design and build radar systems for use by the Australian Army, Navy and Air Force during World War II.

An air-warning radar unit was sent to Darwin in late 1941, but when the Japanese air force first attacked the town, the unit was barely out of the crate and not yet operational. Scientists from the Radiophysics Division in Sydney were hurriedly sent from Sydney to get it working in time to issue a warning of the second raid, which was effectively repelled. A major innovation in radar was the use of more accurate microwave radiation instead of the broader-banded UHF. A research team at Birmingham University led by the Australian Professor Mark Oliphant invented the resonant cavity magnetron to efficiently generate microwaves in 1940. This was crucial in the Battle of Britain as they improved the ability of radar to detect low-flying aircraft[40].

From the beginning, there was a strong emphasis on all-Australian component manufacture because of the country's isolation and the vulnerability of supply routes. The PMG's Department made some of the early hardware, but commercial electrical firms (mainly AWA and STC), with little experience beyond building wireless sets, were soon called in. Eventually, they produced some remarkably sophisticated equipment, particularly later in the war when microwave radar was developed.

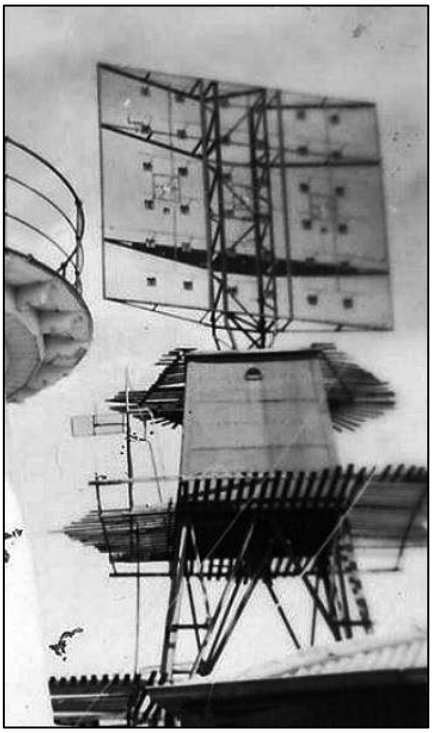

Figure 10 WWII Radar at Cape Cleveland, Qld (Ozatwar website)

During the war, the Division of Radiophysics and Sydney and the PMG Research Laboratories in Melbourne developed more than twenty different radar systems. The major technological achievement of the research groups during the war was the Light Weight Aircraft Warning system operating at microwave frequencies[41].

Jack's Air Force service

In September 1941, Jack enlisted in the Royal Australian Air Force (RAAF) at the recruiting centre in Brisbane and was mustered as a trainee radio mechanic. The next month he commenced training for this position at the No. 1 School of Technical Training, which by then was located in the Melbourne Exhibition Building.

In January 1942, Jack received the details of a four-year Departmental Course of Training for Cadet Engineers in Melbourne by the Deputy Director of Posts and Telegraphs. This was a very comprehensive course that includes several university subjects in mathematics, physics and engineering drawing and design. It seems that in 1941 he was planning to undertake this course the following year before deciding to enlist in the RAAF instead. In the end, he didn't start the course until after the war.

In April 1942, he commenced a Radio Mechanic course at the No. 1 Radio School, Richmond Air Base, New South Wales. This course finished near the end of May and he travelled to Sydney before

making his way back to Air Force Headquarters in Melbourne. While he was in Sydney, the Japanese midget submarine attack occurred on 31 May, resulting in the sinking of the Australian Navy depot ship *HMAS Kuttabul*, and the loss of 21 Naval personnel who were being accommodated on board[42]. This sudden attack caused some panic and an exodus from Sydney, and Jack recalled that before the attack he had difficulty finding lodgings, but the next day landlords were calling him with rooms to spare.

Figure 11 Horn Island airstrip, 1943 (Australian War Memorial website)

In June 1942 he was attached to the No. 5 Maintenance Group in Darling Point in Sydney before joining 7 Squadron at Nowra in September. This was a bomber-reconnaissance squadron using Beaufort bombers. He told me a plane he was flying in crashed into Jervis Bay during a training flight, but he escaped unhurt. The unit moved to Ross River Airfield near Townsville in November 1942. From December 1942 to March 1943, he was attached to the 28 Operational Base Unit at Horn Island in Torres Strait. While serving there, he was mustered as a Ground Radar Mechanic.

Jack's Air Force service record shows that between March and May 1943 he was on temporary duty outside the Australian mainland with the 7 Squadron. This squadron spent much of that year on convoy and reconnaissance duties around the Gulf of Carpentaria and south-west New Guinea. In July 1943, he was attached to 43 Squadron in Bowen, Queensland, moving the following month to Karumba near Normanton on the Gulf of Carpentaria. From October 1943 to February 1944 he flew to 11 Squadron in Bowen then to Cairns, both on temporary duty. The unit then moved to Darwin in April 1944.

For most of 1944 and 1945, Jack was working on the development and installation of radar equipment in Australia and Papua New Guinea, including at the Radio Development and Installation Unit at Croydon, New South Wales and at Air Force Headquarters in Melbourne. The RAAF service records show all the postings and attachments, but give no information about a serviceman's function or activities in each unit or location. However, Jack gave more details of his service in the RAAF in a written application for a posting to Adelaide in 1959.

While in the Development and Installation Unit, he was in charge of the installation of many high powered radar and communication stations in Northern Australia and the south west Pacific Area. This included installation of the 20 kW high frequency station and aerial arrays in Western Australia,

installation of a 10 kW radio teletype system from Sydney to Port Moresby, and installation of a major network of long range ground radar stations in New Guinea.

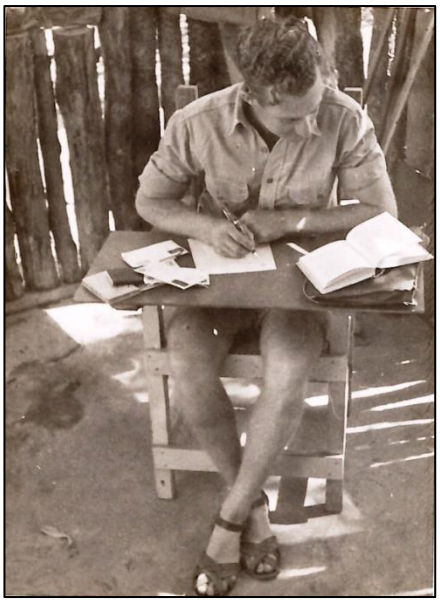

Figure 12 Jack studying in Darwin, 1944

Then in 1945, he was attached to the Radio Section of the PMG Research Laboratories in Melbourne, where he worked on the investigations associated with short wave aerial matching problems and the design of high voltage insulators. He gained experience in the techniques of research and analytical investigation and assisted in the preparation of several research reports for the Directorate of Radar and Telecommunications[43].

Jack was promoted a number of times between 1941 and 1945. He began his service in the RAAF with the rank of Aircraftsman. He was promoted to Leading Aircraftsman in August 1942, Corporal in April 1943, Sergeant in April 1944 and finally Flight Sergeant in April 1945. His trade at the end of his service was listed as Radar Mechanic.

Figure 13 Maime Frew, 1943

In February 1945, while he was briefly attached to the Personnel Depot in Brisbane he met Maime Frew, who was an equipment assistant in the Air Force Headquarters in Sandgate, Brisbane. Maime

was born in Melbourne, and had spent most of her life there, but in 1942 she moved to Brisbane to work for Lady Winifred Wilson, the wife of the Queensland Governor. She enlisted in the Women's Auxiliary Australian Air Force (WAAAF) in 1943. Jack and Maime were married in Melbourne in November 1945 after Maime was discharged from the service. Maime was an accomplished seamstress, and when she left Government House Lady Wilson gave her enough silk to make her own wedding dress. After the wedding, they moved back to Brisbane to live. Jack was discharged from the Air Force in February 1946.

Ross Park

This park is on Sandgate Road at Nundah, north of Kedron Brook, and today is a well-known skate park and picnic spot. Jack's younger brother Bryan started work as an apprentice motor mechanic after leaving school in 1943, and he saw a lot of activity on the site of the park over the following few years. He remembered that American soldiers were camped at Eagle Farm and Doomben racecourses during World War II, and they used to throw away many supplies that could be salvaged. Wally managed the council tip on Sandgate Road in Nundah that was their main dumping place.

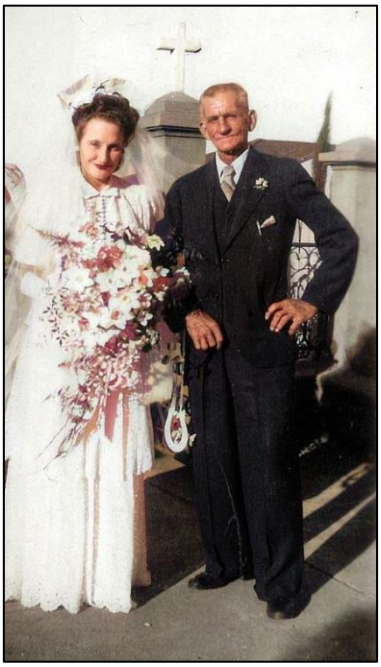

Figure 14 Wally at Joyce's wedding, 1944

Wally always treated items such as cigarettes, cigars, tobacco, alcohol, and tins of dehydrated eggs and milk as gifts to him. Other useful things like bottles, aluminium and copper wire were also dumped. One day, the six-furlong post from the straight at Doomben racecourse turned up, and Wally arranged for one of their vehicles to drop it off at home in Virginia, where it was used as a support for an overhead electrical lead from the house to the horse stables, and also as part of a radio antenna. Bryan would sometimes drive the family's 1926 Chevrolet utility to the garage where he worked, then after work he would drive to the dump and Wally would load up saleable items like bottles to take home to Virginia.

Eventually, Wally's council hut at the dump was almost filled with salvaged items, so he had to scrounge a lean-to cover from the Americans for some shade while he sat outside the hut having his

morning tea and lunch. There were many attempts to break into the hut to get at the salvaged items, but some of them were Pyrrhic victories, because Wally devised some cunning methods of deterring burglars. One of his ideas was to rig up a one-gallon dish of old black sump oil over the door, and it made his day when he came to work one morning and saw a trail of old black sump oil leading away from the hut!

Figure 15 Ross Park, Nundah, 2007

Wally put up a sign over the door of his hut claiming the dump to be “Ross Park”. Presumably this was Wally’s idea of a joke, but the name caught on, as Bryan remembered the American army maps of the time had Ross Park marked on them[44]. After the war, when the landfill area was levelled off and turned into a public park, Wally’s efforts were recognised by officially naming it Ross Park. Wally passed away in 1950.

Brisbane (1946 – 1959)

Queensland recovers from the war

In contrast to the 1930s Depression, World War II and its aftermath had almost full employment. The higher disposable income gave youth an unprecedented access to new American-based popular culture. By the mid-1950s, Queensland was experiencing its first long economic boom since separation from New South Wales a century before. Due to slow industrialisation in Queensland at this time, post-war migration was relatively slow in the State - between 1947 and 1961, Queensland's overseas-born populace grew by 56%, compared to the national average of 139%.

The mining industry boomed in the wartime and post-war years, helped by the World War II and Korean War demand for metals. Mineral extraction expanded fivefold in the 1960s, after doubling during World War II and again in the Korean War years of the 1950s. The world's largest bauxite deposits were found at Weipa on western Cape York in 1955[45].

Early broadcast radio history

Experimental radio broadcasting in Australian started in 1921, and in 1923 the first radio station 2SB first broadcast a live musical concert in Sydney. Queensland's first radio station was 4QG in July 1925. The size of the State and the remoteness and isolation of some areas increased the reliance on radio as a form of communication. Australia developed a unique hybrid broadcasting system which the Government thought would utilise the best features of the British public system and the American commercial system. This would develop into the publicly-funded ABC which provided a national service, and a commercial system which focused on local service delivery.

The opening of 4QG in 1925 was followed a couple of weeks later by 4QR in Toowoomba. Radio boomed in the 1930s, and by 1940 Brisbane had another four stations and many regional centres had their own stations, including some of the more remote towns of Charleville, Longreach, Roma as well as the major towns on the coast up to Cairns. Regional commercial radio stations became information hubs for local communities, broadcasting family notices, weather forecasts, club meeting times and stories from local newspapers. They had the ear of some 80% of their communities.

During the 1940s, the ABC began to develop specialised services for rural listeners, starting with *The Country Hour* in 1949. In Queensland, radio often played a vital role during floods, cyclones and bushfires when it was the only connection with the outside world[46]. Even now, despite the wide range of mass media available, residents affected by natural disasters are still urged to tune in to local ABC radio, often using the dusty old battery-operated transistor radio they kept in the shed for the purpose.

Building a career at the PMG

When Jack and Maime moved back to Brisbane in 1946, they lived in a house in Paddington that was owned by Maime's friend Maud Humphrey. Their son John was born in November 1946 while they were there. Keen to increase his technical qualifications, Jack enrolled in the Diploma Course in Mechanical and Civil Engineering at the Brisbane Technical College from 1946 to 1948[47].

In 1948, the family moved to a rented house in the outer suburb of Clontarf. In May, Jack was provisionally promoted to Cadet Engineer, 3rd Division, Engineering Branch[48]. Betty was born in

August 1948 while they were in Clontarf. In 1949, Jack finally commenced the Departmental Course of Training for Cadet Engineers that he planned to do before the war, completing the fourth year examinations in July 1953[49]. As part of this course, he passed Pure Mathematics I and II, Applied Mathematics I and Physics I and II at the University of Queensland in 1949-50[50].

Figure 16 Maime as a bridesmaid, 1945

In 1949, Jack and Maime purchased a house in Albion. It was a typical weatherboard Queenslander (flood-proofed and air-conditioned on stumps), and is still standing today, backing onto the Albion Oval. Following the successful completion of the Cadet Engineer training course, Jack was promoted to Engineer Grade 1, 3rd division[51]. So from that point, he was officially a fully-fledged engineer. In 1954, he helped coordinate the outside broadcast facilities in Queensland during the first visit of Her Majesty Queen Elizabeth II[52], and was issued a police pass granting him State accreditation during the visit[53].

In December 1954, Jack's fellow engineer Frank W. Sharpe supervised the completion and testing of the transmitter at the new 10 kW regional short wave station 4QL at Longreach, while Jack was the broadcasting maintenance engineer. The new station represented a fifty times increase in power from the original station in the town (which had a power of 200 watts), and would be a boon to all radio listeners within a radius of 100 to 150 miles of Longreach and the Barcaldine area[54]. Doug Sanderson (1923-1994), who was Jack's former school mate at Boondall State School, had been a Senior Technician on the installation of the original temporary 4QL transmitter in 1947[55].

Jack was a keen student of the law, particularly arbitration and Government administrative law. In 1956, he applied for[56] and was appointed a Justice of the Peace and magistrate in Queensland[57]. The radio network expanded rapidly during Jack's association with transmitting stations, and to assist the large number of new staff joining the organisation, he wrote a handbook for the maintenance of ABC regional studios[58].

In June 1959, he completed the design, installation and testing of the new 55 kW station 4QN in Townsville when the Brandon facilities were established to replace the installation at Clevedon. This was the largest single project undertaken in broadcasting in the State at the time. New techniques and practices were adopted, including the first use of transistors in a transmitter used by the ABC network.

Figure 17 Jack at 4QL Longreach, c1954

In March 1959, Jack applied for the position of Divisional Engineer, 3rd Division in the Broadcast Transmitter Division at Adelaide, South Australia[59]. The promotion was approved in June[60] and after the Brisbane house was sold, we set off in the family's FE Holden Special for the week-long drive to Adelaide. Probably the highlight of the trip was experiencing television for the first time in a shop window while staying overnight in Mittagong.

Adelaide (1959 – 1988)

The ABC network in South Australia

After arriving in Adelaide in 1959, Jack and Maime purchased a house in the suburb of Plympton Park. It was next door to Morphettville Racecourse, which was a source of some entertainment on race days, but also frustration as the high galvanised iron fence prevented a view of the action they could hear inside the course. It was only after they left Adelaide in 1988 that the old fence was final replaced with the wire fence they always hoped for.

Jack was soon hard at work installing ABC radio stations in South Australia. The two Adelaide stations at the time were 5AN (for metropolitan listeners) and 5CL (for a regional audience). 5AN started transmitting in 1937 with studio equipment in the Adelaide central telephone exchange and a transmitting mast in Post Office Place, Adelaide. The transmitter was moved to Brooklyn Park in 1944, which was already the site of the 5CL transmitter. Adelaide Airport was relocated from Parafield to the present site at West Beach from 1946, with flights commencing in 1954. The 5AN mast was moved to another part of the site in 1952 to make way for an access road to the airport.

The new airport, the rapid growth of nearby housing and the need to upgrade equipment at the end of its economic life led to a decision to establish the station at another location with new equipment. A site of about 24 hectares was purchased at Pimpala, near Reynella, to establish a metropolitan transmitting centre for 5AN and 5CL. Building work commenced in October 1959 and equipment installation started in August 1960. There was a 55 kW main transmitter and a 10 kW standby transmitter for 5CL, with a 10 kW main transmitter and a 2 kW standby for 5AN.

The station was officially opened in September 1961[61], and Jack received a letter from the Assistant Director (Engineering) of the PMG congratulating him on the high standard of work and performance during the project[62]. In August, Jack addressed a meeting of the members of the Institution of Radio Engineers in Adelaide, giving an analysis of faults in broadcast transmitters[63]. Then in October, he addressed another meeting of the Institution on the Pimpala Transmitting Centre[64].

In February 1965, Jack presented a paper to the Technical Committee at a Commonwealth Broadcasting Conference on the ”Design of a 250 kW Aerial Switch for High Frequency Stations”[65]. This was probably in relation to his work in the design of the Radio Australia booster station being planned for Darwin, where innovative computer modelling was used in the aerial design.

In the early 1960s, Jack decided to further his engineering qualifications by studying part-time for a Bachelor of Science in Electronics Engineering at the Pacific International College of Arts and Sciences in Los Angeles, California. He was awarded this degree with First Class Honours in July 1967[66]. I remember Jack expressing bemusement at the very broad-based American college education when he had to pass subjects in American History, American Government, Life Science, American Literature, Business Law, Psychology and Philosophy, as well as more useful topics such as Vacuum Tube Circuits, Electronic Circuit Design (I, II and III) and Transistor Physics[67]. After the course, he could tell the family more about former American Presidents and poets than we really wanted to know.

Radio Australia booster station in Darwin

Although the International Shortwave Service had been operating through Radio Australia facilities at Shepparton in central Victoria since 1944, a technical investigation into reception in the main target areas was not undertaken until 1957. A trip by H. W. Hyett of the PMG's Central Office to countries in South and East Asia revealed that while the service was reasonably good, there were periods when transmissions suffered from interference from other stations or jamming activities. Additional aerials were subsequently erected at Shepparton to improve reception.

Figure 18 Collins Radio Richardson TX (Collins Aerospace Museum)

A further study was undertaken in 1959 where detailed reception tests were conducted at major population centres such as Singapore, Bangkok, Saigon, Hong Kong, Tokyo and Manila. As a result of the two investigations, plans were drawn up to establish a high-power booster station near Darwin to rebroadcast the transmissions from Shepparton. This would improve signal levels in South East and East Asia. Following several on-site examinations of areas around Darwin by Jack and Cliff Savin (Divisional Engineer, Headquarters Radio Section), two sites on opposite ends of Cox Peninsula were selected as being suitable for the two planned stations. Site works commenced in 1965[68].

In June 1967, approval was sought for Jack to visit Collins Radio at the Richardson manufacturing plant in Texas to attend the factory testing of the newly-constructed 250 kW transmitters. Because he had been so closely involved with managing the project from the early 1960s, he was deemed to be the ideal person to monitor the testing process and to gain valuable first-hand knowledge of all the equipment that would be installed at the Cox Peninsula site.

The trip of about six weeks occurred between the middle of September and the end of October 1967. It was the one and only time Jack left Australia (except in a Beaufort bomber during World War II), and he was able to add a few days of sightseeing along the way, especially at the start and the finish. He arrived in Los Angeles and before flying to Collins Radio in Dallas managed to visit Disneyland, the Hollywood Wax Museum, Knott's Berry Farm and MacArthur Park. After flying to Dallas, one of the Collins engineers took him to a Dallas Cowboys versus New York Giants football game (after schoolboy rugby league, the helmets and interchangeable teams for offence and defence must have been bewildering).

He flew to a number of other cities such as Bethany (Ohio) where he inspected the large Voice of America relay station. He then flew to Washington DC and then drove to Greenville (North Carolina) where he visited another Voice of America transmission site. This was the world's most powerful broadcasting facility, boasting nine transmitters: three of 500 kW, three of 250 kW and three of 50 kW[69]. Back in Washington, he had time to visit the Washington Memorial.

While staying in Washington, Jack flew to New York for a day trip, visiting Radio City, the CBS Studios at the RCA Building, and the Empire State Building on Fifth Avenue. On Sunday he experienced the exuberant American brand of religion at a Methodist church service before visiting the George Washington University. After flying to Dallas, he was taken by a colleague to the Dallas State Fair on a very rainy opening day.

A short news video of that day can be viewed at this link:
https://texashistory.unt.edu/ark:/67531/metadc700131/m1/

He then went to the other Collins Radio facility at Cedar Rapids, Iowa, where the equipment testing was conducted for several days. The testing was then completed over several more days spent at the Richardson factory.

After the testing was successfully completed, Jack flew to San Francisco for a few days before returning home. Apart from visiting the Jennings Radio factory, which must have been related to the project, he took a coach tour of the Redwood Forest, Golden Gate Bridge and the Sacramento Art Centre. Another coach tour took him over the Oakland Bridge through the Piedmont area to Palo Alto. He was in San Francisco at the time of the famous Summer of Love, and one diary entry begins "Morning - walk through town - saw Hippies". I can imagine it was a cultural shock for a conservative, suit-wearing engineer from Adelaide![70].

Figure 19 Clearing the jungle - Cox Peninsula, 1973

The transmitting equipment was dispatched to the Cox Peninsula site and installed, and the first test transmissions took place in December 1968. Two regular transmissions commenced in December 1969 and installation work was completed in 1970. But because of problems with the transmitters and aerial systems, regular and reliable transmissions using the full 250 kW from three Collins transmitters did not commence until September 1971. The project represented an important landmark in high power high frequency aerial design because computer modelling was used for the first time in Australia to establish the design parameters for a modified form of the aerial system proposed by the aerial contractor (Complementi Elettronici S.p.a. of Italy). The programs were provided by an off-air pickup of transmissions from Shepparton with a receiving station also located on Cox Peninsula, about 15 kilometres from the transmitters.

From 1974, programs were provided over Telecom broadband landline circuits from the ABC Radio Australia studios in Melbourne. But catastrophe struck in December 1974 when Cyclone Tracy almost completely destroyed the five aerial systems and transmission lines. The main transmitter building itself was not extensively damaged, but water caused serious damage to the three transmitters and associated equipment. Jack had been the supervising engineer for the operation of facilities up to that point.

Rehabilitation work was approved by the Parliamentary Standing Committee on Public Works in 1980 at an estimated cost of $10 million. This involved repairs, replacements or upgrades to almost the whole installation, and the station eventually resumed transmissions in September 1984. Jack was one of the engineers from the South Australian Section involved in the rehabilitation activities and subsequent operation of the facilities. Although the station was originally designed for five 250 kW transmitters, it was not until 1991 that Government funds were provided for two additional transmitters to complement the original three. Two French-made Thomson-CSF transmitters were installed and put into full operation in early 1994[71].

Broadcast technology heritage

Through the 1970s, Jack was growing in seniority both in the PMG and in the wider field of radio broadcast engineering. In February 1970, the General Secretary of the Institution of Radio and Electronics Engineers advised Jack that he had been elevated from Associate Member to Fellow[72]. This grading is awarded to "those engineers who had demonstrated outstanding proficiency and had achieved distinction in their profession"[73].

Recognising the rapid pace of technological change at this time, Jack became interested in preserving the knowledge and experience he had gained. In February 1971 he obtained permission from the Commonwealth Public Service Inspector for South Australia to write and publish a textbook on radio engineering in his spare time[74]. This eventually became the 964-page *Handbook for Radio Engineering Managers*, which was published in Britain by Butterworth-Heinemann in 1980. This book covers in considerable depth issues such as safety in the design, installation and operation of radio engineering facilities, fires and structural failures, and project management.

In 1975, the PMG was split into Australia Post and Telecom Australia. After publication of the book, Jack was interviewed for the Telecom house journal in Adelaide, and told the journalist that it took forty years of practical experience in radio engineering to acquire the knowledge and ten years to put it together in book form, working into the night and during weekends. The book is truly

international in character, as it includes case studies and photographs from the UK, USA, Canada, South Africa, several European countries, Japan and Australia[75].

Figure 20 Telecommunications display at Adelaide GPO, 1973

In 1973, many items of old telecommunications equipment were loaned by various people for a display to mark the fiftieth anniversary of broadcasting. In November, the exhibition was opened in the main hall of the Adelaide GPO by Sir Mark Oliphant, the Governor of South Australia. Jack had been instrumental in setting up the display[76] and showed senior Post Office and PMG staff around[77].

After the display period was over, Jack and his colleagues managed to persuade some of the equipment owners to donate their artefacts permanently, as the basis for a large museum tracing the history of telegraphy, telephony and radio in the State. I can remember over the next few years Jack took delivery of or drove out to pick up several old pieces of radio equipment. He then painstakingly cleaned and repainted the artefacts so they looked new again, even if most were so old they no longer worked. The fruits of this labour of love were seen at the opening of the permanent Telecommunications Museum in Electra House in the Adelaide CBD in July 1978.

This very comprehensive display, which traced the history of telegraphy, telephony and radio in South Australia and the Northern Territory, occupied all three floors and the basement of the building, and was officially opened by Sir Mark Oliphant. Jack read an address to the Governor on the occasion, reminding him of the earlier opening in 1973, and presented him with a copy of his new book on the history of radio in South Australia[78]. The book covers the development of radio in the State from William Bragg's first public demonstration of wireless telegraphy in 1897 to the tome of publication[79].

An enthusiastic review of the museum in *Amateur Radio Action* magazine in 1989 was written by the Melbourne cartoonist John Kolm, an amateur radio operator (VK3YJK), who wrote that the displays showed that amateur radio had carved an enduring place in the nation's history. There were QSL cards (reception verification cards) from amateurs scattered throughout the museum, and he made the point that the advanced state of telecommunications was to a large extent the result of amateurs tinkering and experimenting until new discoveries were made or existing discoveries were

improved. He concluded that the museum was not so much a room full of radios but a social history, and he urged his fellow amateurs to visit it[80].

Figure 21 Jack and Sir Mark Oliphant, Telecom Museum, 1978

The museum was closed in September 1992 when Telecom decided to sell the building. A plan of management for the collection was agreed between Telecom and the History Trust of South Australia. Peter Strawhan, Curator of Technology of the History Trust arranged for the radio and telegraph items from the collection to be stored at the Norwood Telephone Exchange building, with archives being located at Croydon. Members of the local Historical Radio Society of Australia were concerned that the radio items in the collection would be disposed of, so some members approached Telecom, the owners of the collection.

As a result of this approach, the core collection was made available for display by the Australian Museum of Technology. The major part of the radio collection was then stored and displayed at the ABC Collinswood studios[81]. Some of the items are now exhibited by the National Trust at the Telecommunications Museum at Mount Laura Station near Whyalla, South Australia[82].

As well as the major work on radio engineering management and the history of radio in South Australia, Jack also found time between 1976 and 1978 to research and write a five-volume 1420-page book on the history of telecommunications on stamps[83]. A review of the first volume in *Stamp Monthly* magazine in May 1976 was not happy with the lack of detail on the stamps. But the reviewer assumed it was a book for stamp collectors (which it was not) rather than for telecommunications historians (which it was)[84]. In fact, the historical events depicted on the stamps are described very comprehensively.

When Jack was preparing for retirement at the end of 1987 (and planning to move interstate afterwards), he offered to sell his large collection of 2,300 telecommunications stamps to the head office of the Overseas Telecommunications Commission (OTC) in Sydney. He wrote to the Managing Director to say that the collection had cost well over $6,000 up to 1978 and included about 300

colour slides of the stamps, another 5,000 stamps not used in the books, 150 miniature sheets and some 700 First Day Covers[85]. OTC accepted Jack's offer to sell the lot for $5,000 and would pay the cost of transport to Sydney[86]. It is not known where this collection is today, as OTC was combined with Telecom in 1993 to form Telstra, so there would have been considerable changes to the organisation from that time.

Jack had to take some time off work in March 1981 to recover from the removal of a melanoma from his back. He thought that the seeds of this potentially fatal cancer must have been sown when he was stationed in the tropical part of the country during World War II, and the troops often went shirtless in the heat and humidity. He received a number of letters from his colleagues wishing him a speedy recovery, including Murray Coleman, the State Manager of Telecom[87]. He recovered with no ill effects and eventually returned to work.

Jack had always been a very keen gardener, and from the early 1980s he started taking an interest in hydroponics, or soilless cultivation. He had built a ten-metre swimming pool in the back yard of the house in Plympton Park in the 1960s, but after my sister and I moved away, the pool fell into disuse and Jack decided to turn it into a hydroponics nursery. He conducted extensive experiments on the cultivation of orchids, tomatoes and other plants, which he recorded in several notebooks. These formed the basis of two books on the subject in retirement.

Figure 22 Jack and Philip Satchell, Telecom Museum, 1982

July 1982 was the fiftieth anniversary of the ABC, and much of the equipment from the Telecommunications Museum was displayed around Adelaide during the celebrations, including in the hall of the General Post Office. A temporary broadcasting studio was also set up in Electra House on July 1st, and Jack was interviewed a number of times through the day by Philip Satchell on ABC radio to talk about the development of radio since 1932[88].

Jack was widely acknowledged to be an expert on radio heritage by this time, and was frequently asked to address a variety of groups on the subject. He addressed the Rotary Club of Brighton in February 1982[89]. In September 1982 he spoke on the early days of radio in South Australia at a

meeting of the National Trust of South Australia[90]. Then in October 1983, he spoke about the invention of the telephone at the Symposium on the Celebration of the Centenary of the Adelaide Central (telephone) Exchange, organised by the Telecommunication Society of Australia[91].

In November 1983, Jack applied for promotion to the position of State Broadcasting Manager, South Australia. In his application, he mentioned that he had been the Chairman of the ABC State Program Advisory Committee from 1979 to 1983, a committee member of the National Trust of South Australia, a foundation member of the Heritage Committee of the Institution of Engineers Australia and was a Fellow of the Australian Institute of Management[92]. The promotion was approved the following month[93].

On the reopening of the Radio Australia booster station near Darwin in October 1984, Jack gave an address on the history of the project to the assembled dignitaries, including the Minister for Communications Michael Duffy, who officially opened the station[94]. Jack was interviewed the following month by Peter Lucas from *Scan* (the ABC house journal), and said that when Cox Peninsula was first selected as the transmission site, it took three days to blaze a path from the jetty to the site because it was all jungle, but now they can do the trip in twenty minutes or less[95].

Jack was becoming more serious about hydroponics by 1984. In December he completed a course in hydroponic cultivation given by the Darling Downs Institute of Advanced Education[96]. In 1986, Jack oversaw the installation of high power high frequency broadcasting stations at Katherine, Tennant Creek and Alice Springs in the Northern Territory. These stations enabled coverage of the entire Territory with ABC and Aboriginal programs, enabling outback stations and Aboriginal communities to receive locally-generated programs for the first time[97].

Jack continued to be in demand as a speaker on different aspects of radio heritage. For example, in May 1987 he travelled to Canberra to deliver a paper on early carbon microphones used in broadcasting at the Eighth National Conference of the International Association of Sound Archives at the National Film and Sound Archives[98].

Jack finished his career at Telecom at the end of 1987 when he reached the retirement age of 65. In a letter to the staff of the Broadcasting Directorate of Telecom Australia, he wrote about the changes in broadcast technology he had witnessed during his fifty years in the organisation. In the early days, radio transmissions were restricted to 100 hours a week with a break in the middle of the day for maintenance. Originally, all transmitters were staffed while in operation, but later an increase in confidence and reliability resulted in the somewhat nervous decision to only staff the stations during the day with a senior technician.

Many other changes have been made to the technology, but on the other hand office management functions hardly changed in fifty years: there were still Personnel Officers, works officers, typists, registry officers and so on, and they still did much the same work. Computers hadn't changed things to any great extent. Project expenditure and estimates were still as far out as ever, target dates were still missed by a mile (or is it a kilometre?), assessment of allowance payments still drove the Personnel Officer crazy, files still disappeared down a bottomless pit never to be seen again, yet they still seemed to run an efficient organisation.

Jack thought that what was missed the most by old-timers was the hands-on involvement with almost every item of station equipment. There were lots of mechanical components, and the Officer in Charge was an expert in nearly all of it. He had no time to relax, and each hour was a challenge to keep the transmitter on air. There was always a sigh of relief when the ABC announcer played God Save the King (and later the Queen) to signal the close of transmission for the day.

Staff tended to stay at stations longer than they did in 1987. One of their technicians spent his entire working life at the one station, starting with the installation in 1939 and retiring in 1970, having served an unbroken period of 31 years - perhaps others have served longer. On retirement, some staff would slip away quietly and get their crystal sets out of mothballs and tickle the cat's whisker. This is what he intended to do. He felt fortunate to have been associated with broadcasting for so long in such an exciting period of development[99].

Port Macquarie (1988 – 2021)

A sea change retirement

Jack had always been an enthusiastic home handyman, and by 1988 there wasn't much more he could add to the house in Adelaide. He'd filled the large back yard with a swimming pool, a tennis court, a garden shed, a hydroponic nursery, and had covered in the rear porch and erected a trellis to grow wisteria. He had essentially built the place out, and I sometimes wondered if he needed to move so he could take on a new set of DIY challenges.

After almost thirty years in Adelaide, with its hot dry summers and cold wet and windy winters (I remember it because I lived there for twenty years), Jack and Maime decided to retire to somewhere with milder and less extreme weather. After some research, Jack found that Port Macquarie in New South Wales had some of the best weather in the country, rarely flooded and was surrounded by many good places to visit in the Mid-North Coast region. So in October 1988, they flew there and looked around for a place to buy. After a week they came across a large house just behind Shelley Beach with good elevation and an extensive garden, located about five kilometres from the centre of town. They agreed on a price, then returned to Adelaide to organise the move interstate.

Jack's outstanding contribution to the preservation of radio broadcasting heritage was officially recognised by his appointment as a Member of the General Division of the Order of Australia in the 1989 Australia Day honours[100]. He received letters of congratulation from many of the organisations he had been closely associated with, such as the Institution of Engineers Australia in Canberra[101], the National Film and Sound Archive[102] and the Australian Film Television and Radio School[103].

Unfortunately, Jack and Maime were unable to attend the awards ceremony at Government House in Sydney in April due to industrial action by air traffic controllers. When they arrived at Port Macquarie airport on the morning of the ceremony, they found their flight to Sydney had been cancelled. Jack wrote to the Governor General's secretary and asked for the insignia to be posted to him, as he didn't want to risk going through a similar experience if they attended a later ceremony[104].

Despite the disappointment of missing the awards ceremony, Jack was very proud of the honour bestowed on him, and accepted an invitation to join the Order of Australia Association[105]. He attended many of the annual dinners for Association members in Canberra in the years that followed, and supported the local Hastings-Macleay Branch.

In March 1985, an in-house newsletter was inaugurated for the technical staff of Telecom's recently-created Broadcasting Directorate, and Jack was invited to become its editor. It was titled the *Broadcaster*, and was issued every four months until November 1994. Jack edited every edition and contributed many articles. The assistant editor was Jerome Van Der Linden, who was a keen short-wave listener in the 1960s when I was also pursuing this hobby. Jack's former schoolmate Doug Sanderson was a frequent contributor with informative and entertaining articles on radio and television stations.

The cover of the July 1987 edition featured a poster Jack created to commemorate the fiftieth anniversary of the death of Guglielmo Marconi (1874-1937), the inventor of radio. He also wrote a

tribute to Marconi for the edition[106]. The poster featured commemorative postage stamps, and the original was donated to the Marconi Club in western Sydney. A feature of each edition of the *Broadcaster* was up to five cartoons that were specially drawn to illustrate some of the articles. They were always humorous, sometimes esoteric, and a number of them referred to the challenges encountered by technicians who had to scale the very high transmitter masts.

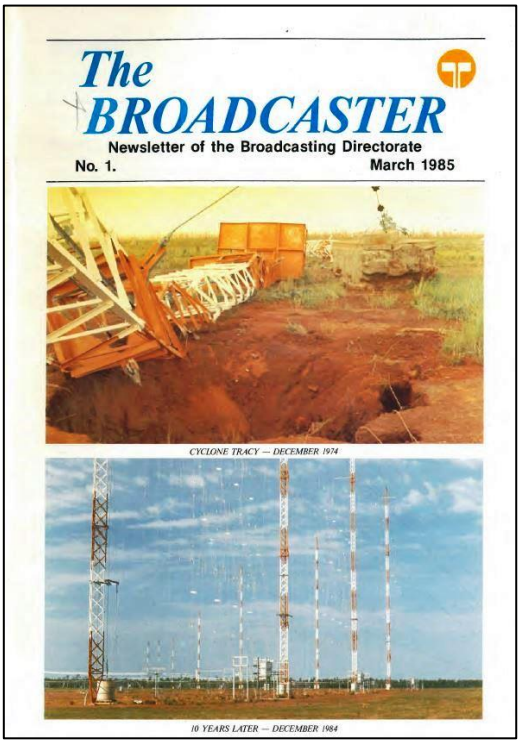

Figure 23 *The Broadcaster* first edition, March 1985

Jack rebuilt his hydroponic nursery inside a fibreglass greenhouse that covered the rear porch of the house, and resumed his research into cultivation of various plants. In 1993 he wrote a book on hydroponic cultivation of orchids, which he did not seek to publish at the time. His favourite orchid seemed to be the Cooktown orchid (Dendrobium bigibbum), a bright mauve butterfly orchid which hung in many pots on the wall of the porch. He also grew many rock orchids (Dendrobium speciosum). The perfume from their cascading pale yellow flowers filled the greenhouse in late winter every year.

Soon after arriving in Port Macquarie, Jack enrolled in a horticulture course at the local community college, and before long was planning the transformation of the fairly basic garden into a multi-leveled haven of palm trees, orchids and bromeliads. The sloping battle-axe block (surrounded by five neighbouring properties) was about 1,470 square metres, so there was plenty of outside space to work with. I visited Jack and Maime on most public holiday weekends, and we invariably took a river cruise, of which there were many around Port Macquarie and further afield at Taree and the Bellinger River.

By the mid-1990s, however, Maime was becoming frail, and the year 1994 was an annus horribilis for Jack, Maime and my sister Betty. In August that year, all three were in the Port Macquarie Private Hospital: Jack had an operation for bowel cancer, Maime had suffered a fall and fractured her femur for the second time that year, and Betty was in palliative care with the cervical cancer she first

experienced in the mid-1980s. She passed away in September but Jack and Maime recovered, although they never fully got over the loss of their daughter. Maime gradually developed dementia and passed away in 2000.

Jack decided to give the *Broadcaster* job away at the end of 1994 because of the difficulties of that time. Les Rogers, General Manager of Broadcasting at Telecom Australia wrote a letter of appreciation for Jack's sterling work in editing the newsletter over ten years. He also said the newsletter would end there, as he didn't think there was anyone with Jack's knowledge of broadcasting who could do justice to it[107].

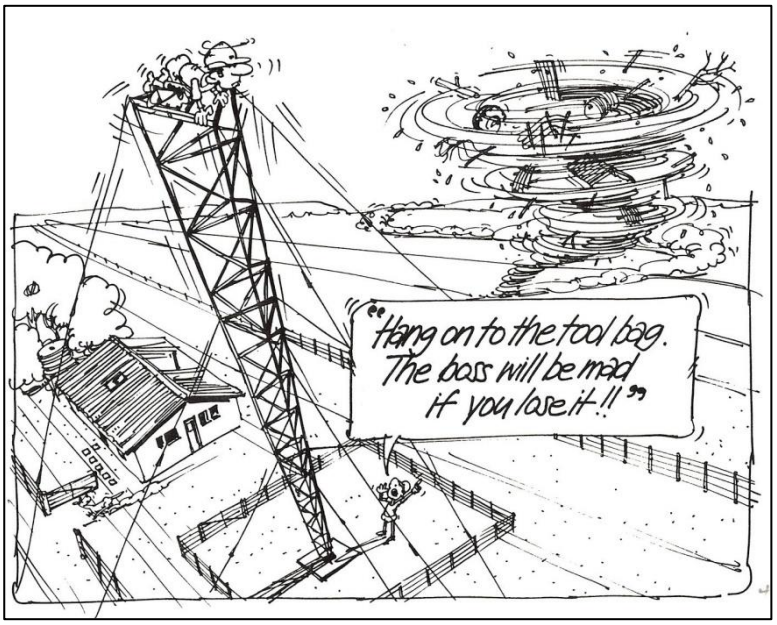

Figure 24 ***The Broadcaster*** **cartoon, March 1993**

Jack's extensive research into hydroponic cultivation resulted in the book *Hydroponic tomato production*, published in Sydney in 1998[108]. This book sold well, and a year or so later the publisher wrote to Jack saying they heard he had previously written a similar book on orchid cultivation and they would like to publish it. This resulted in *The World of Orchids*, published in 2001[109]. Jack told me later that of all his books, they were the only two that made a profit.

In 1998, Jack published his magnum opus, the history book *Radio Broadcasting Technology, 75 years of Development in Australia, 1923-1998*. This is an extremely comprehensive work that takes the reader through all aspects of the development of radio and television from the early broadcasts in 1923 to the late 1990s. Jack took the approach that all the technical staff who worked on broadcasting projects warranted a mention, not just the senior people, so he included lists of all participants. Unlike the earlier 1977 book on South Australian radio history in which Jack hardly mentioned himself, he was not so reticent in 1998 to take his rightful place among his colleagues in the projects he was involved with.

He published this book himself in a limited edition of 400 copies, printed in Adelaide. He charged the cost price of $200 per copy, and based on the summary book he kept with the sales information on each copy, he sold nearly all of them (apart from a dozen or so given away to some libraries and close friends).

In late 2002, Jack surprised everyone by announcing that he was getting married again. I was as surprised as anyone, but was happy for him to be sharing his life with someone again. It transpired that he and Patricia Gold, widow of longtime friend and colleague Bill Gold, had become close after she was widowed in 2001, and they decided to get married in early 2003. This happy event triggered a new lease of life for Jack, and he spent the next few years or so showing Patricia around the scenic hinterland of the area. She had been living in Canberra, and they travelled there each year for an annual get-together with her friends.

Jack's achievements were still being recognised by the engineering community. In 2004 the Institute of Electrical and Electronics Engineers awarded him the John Monash Medal for Engineering Heritage in recognition of his outstanding contribution to the collection of artefacts and recording of the history of radio technology from the early days through to the present era. It is largely forgotten today that General Sir John Monash trained as an engineer before achieving national fame as a successful World War I leader. After the war, he was appointed general manager of the State Electricity Commission of Victoria and supervised the construction of the State electricity grid, harnessing the huge deposits of Gippsland brown coal to make abundant cheap power for the entire State[110].

The
Institution of Engineers,
Australia

John Monash Medal
for Engineering Heritage
2004

Presented to

John Francis Ross

for his outstanding contribution to engineering heritage,
in recording the history of radio broadcasting technology
and conserving its artefacts.

National President

Chair
Engineering Heritage Australia

CID 50350

Figure 25 The John Monash Medal, 2004

Then in 2009, Jack was presented with the Australasian Sound Recordings Association (ASRA) Award for Excellence. At the presentation dinner in Canberra, it was mentioned that his vast knowledge of audio and radio technology and engineering principles had been a source of information for many at ASRA over the years. He maintained an energetic commitment to the Association, and his ongoing participation at ASRA conferences made him a well-recognised member of the organisation. It was also mentioned that Jack's 1998 book on the history of radio broadcasting technology ensured that the story of our local broadcast engineering industry was not forgotten in an age where most of our broadcasting technology needs are now imported[111].

In 2010, Jack donated his collection of photographic prints relating to broadcasting technology to the Powerhouse Museum in Sydney. There are seventeen folders containing over 500 black and white and colour prints, mounted on folder pages with detailed captions. The photographs document all aspects of radio from its generation to consumption, including studio installations, transmitters, domestic receivers, radio and communications installations from telegraph lines to the age of satellites. They detail the changing technologies, their installation and maintenance and even the results of catastrophic failure and natural disaster.

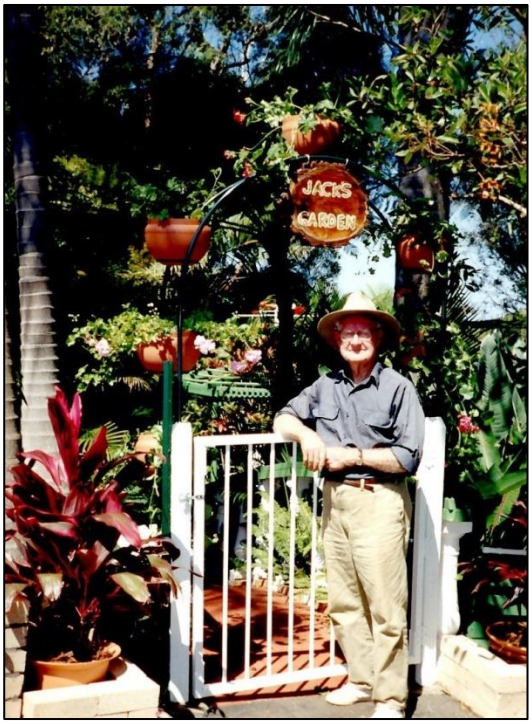

Figure 26 Jack in the garden, 2003

The collection, which the museum has titled the J. F. Ross Archive Collection, had been assembled as research material in the production of his books on the history of radio broadcasting in Australia. The photographs were gathered over an extended period from a pool of contacts which has since evaporated. Many of the images are unique and depict long-since obsolete technologies and practices or dismantled installations. They offer a broad and comprehensive look into the broadcast communications world from its earliest methods and practices (such as Morse code telegraphy) to the digital age[112].

Apart from his work on the large garden, Jack was the ultimate handyman who could build anything and repair anything. He used his knowledge of electronics to install a variety of gadgets around the house: a row of motion-sensitive lights illuminated the driveway at night, several motorised water features entertained visitors in the garden, and a complex network of security alarms and cameras inside and outside with monitoring screens to alert him to any burglars (who never arrived in more than thirty years, but I think Jack enjoyed the technical challenge of working out how to set it up).

There were three kinds of solar heating systems installed on the roof: a Solarhart water heater, a circulation solar heater for the spa in the back porch, and several solar panels for electricity generation. But Jack told me a few years ago that the neighbour's jacaranda tree to the north and

his own pine tree to the north-east had grown so tall they were blocking the sun for most of the day, and he was looking for an alternative source of power. He had the idea of placing a wind generator on the roof (and chopping down several of the tall palms to allow more of the wind to reach the house) and asked me to research it for him. I found a website advertising a range of residential wind systems adapted from marine use and printed them out, but the project never progressed beyond that.

Figure 27 Hydroponics nursery, 2004

From about 2010, Jack was starting to slow down, and being an engineer he looked to technology for assistance. He had a stair lift installed, bought a mobility scooter for nipping out to the local shops, and acquired a couple of walking frames to get around the house and garden. He also had the Red Cross Vital Call system installed to phone him each morning. He always wanted to live at home for as long as possible, and he arranged for a number of home care services to visit on a regular basis. He qualified for a Department of Veterans' Affairs disability Gold Card due to a hearing problem from World War II, and this paid for most of the home help.

Patricia's health deteriorated from about 2013 and she developed dementia and passed away in 2018. In June 2021, Jack suffered a mild stroke, which mainly affected his speech for a few days. But he never fully recovered from the effects and passed away in hospital on 7 July 2021.

Jack was helped at home by a couple of caring neighbours, who dealt with his bins each week and called in to check on him regularly. Jack and Maime were serial adopters of stray cats for as long as I can remember – they would feed any birds or cats that flew or wandered into the garden, and eventually one of the cats would take up residence and become their next adoptee. His last cat (called Kumon by Jack, but Lizzy by Sharon and I) was a great comfort to him in the last few years. After Jack's death, I was able to get her adopted out to a good home via the Port Macquarie Animal Shelter.

Betty Ross remembered (1948-1994)

Betty Frances Ross was born in August 1948 while the family was living at Clontarf in Brisbane. She attended Windsor State School until we moved to Adelaide in 1959, after which she finished her primary education at Forbes Primary School. In 1961, she attended the Methodist Ladies' College (now Annesley College) from 1961 until 1965 when she completed the Leaving Certificate, which qualified her for tertiary education. There were signs of the vocation she would eventually follow when she took subjects in Modern History, Ancient History and Geology[113].

Betty also showed an early interest in art by taking Drawing as an Intermediate Certificate subject in 1963. From 1966, she completed three years of the four-year Diploma of Fine Art Sculpture course at the South Australian School of Art in North Adelaide. She interrupted the course to move to Sydney with her partner Richard Tipping, where they were married in 1969[114]. She worked for a year as an art teacher at the St John's Regional School at Auburn, operated by the Sisters of Charity[115].

Betty returned to Adelaide and in 1972 completed the final year of the Diploma in Fine Art Sculpture[116]. She and Richard had split up by this time, and in 1973 she formally changed her name back to Betty Ross[117]. From 1970, she had worked as a volunteer draughtsman at the Roonka archaeological site in the Murray River valley run by the South Australian Museum, and some of the finely detailed drawings of prehistoric burials are her work.

Betty's participation at Roonka inspired her to study archaeology at the Australian National University (ANU). She participated in archaeological digs in Central Australia and the Central Queensland highlands in 1974 to 1975. During her time at ANU she developed a talent for stone artefact drawing, some examples of which are in Brim Hayden's 1979 book *Palaeolithic Reflections*[118]. In April 1978, she was awarded a Bachelor of Arts (Honours), majoring in Prehistory[119].

Figure 28 Betty at Yourambulla Caves, South Australia

To broaden her experience, she travelled to the USA in January 1978 to take up a two-month post as a teaching assistant in the Department of Anthropology at the University of Arizona, and visited Mexico the following month. For the next ten years she took part in a great many archaeological surveys in South Australia and the eastern States[120]. During this time, she was the editor of detailed publications on the Minerawuta (Ram Paddock Gate) site in South Australia (1981)[121], Aboriginal and

historic places around Adelaide (1984)[122], and a heritage study of Hindmarsh township in Adelaide (1986)[123].

Betty and Richard were divorced in 1986[124]. At about the same time, she was diagnosed with cervical cancer for the first time and underwent treatment. In 1989, she moved to Hobart to explore employment opportunities in Tasmania. She undertook environmental impact studies for a number of State Government authorities, such as the Department of Roads and Transport and the Tasmanian Hydroelectric Commission[125].

She became interested in Tai Chi, the Chinese martial art, which she practised for meditation and health benefits. She visited Malaysia twice in 1991 to study with the Tai Chi masters in Penang[126]. Her progress in the discipline was such that she became the chief instructor at the Academy of Tai Chi Yang Style in Hobart.

Figure 29 Betty and Mouse at home in Hobart

Unfortunately, in about 1992 she was diagnosed with a recurrence of cervical cancer, and became less active in archaeology as her illness progressed. She took up swimming to keep herself feeling as well as possible, and was very proud of winning a bronze medal at the State Masters' Swimming Championships in 1994. She moved to Port Macquarie in the middle of 1994 with her beloved cat (named Mouse) to be with Jack and Maime, and passed away there in September. Tai Chi was her great passion in the last few years, and when she left Hobart she had been helping to organise the Tasmanian Open Tai Chi Games in Hobart.

In her time in Tasmania, she developed a close working relationship with the local Aboriginal community, and prior to leaving Hobart for the last time she donated her car, her extensive archaeological library and many artefacts to the Great Southern Land Management Corporation. She is remembered in the archaeological community for her enthusiasm for her vocation and her first-class draughting ability. The determination she showed in achieving success at swimming and Tai Chi was the hallmark of someone who felt strongly about her work and was always willing to work hard to achieve a high standard in everything she did.

Notes

[1] Charters Towers Story, CitiGold Corporation website.
[2] *The Australian Handbook, 1876.*
[3] Raymond Evans, *A History of Queensland.*
[4] Registers of Rations Issued to Immigrants - Maryborough, 1875-1884.
[5] Queensland Electoral Rolls, 1860-2008.
[6] Queensland Electoral Rolls, 1898.
[7] The road to recovery – a history of mental health services in Queensland, Queensland Health website.
[8] Queensland Birth, Death and Marriage Registers.
[9] Susan Addison and Judith McKay, *A Good Plain Cook.*
[10] Ancestry.com.au website, Pennell family tree.
[11] Queensland Registry of Births, Deaths and Marriages.
[12] K A Austin, *A Pictorial History of Cobb & Co*, Adelaide, 1977.
[13] Queensland Electoral Rolls, 1925.
[14] New South Wales Electoral Rolls, 1937.
[15] NSW Registry of Births, Deaths and Marriages.
[16] Queensland Electoral Rolls, 1883.
[17] Queensland Registry of Births, Deaths and Marriages.
[18] Grave location search and family history, Brisbane City Council.
[19] Queensland Electoral Rolls, 1905-1916.
[20] Queensland Electoral Rolls, 1922.
[21] *The Brisbane Courier*, 6 June 1922.
[22] Queensland Electoral Rolls, 1925.
[23] Jack Ross, Barcoo Wally and his wireless, *Cattle Country Magazine*, Autumn 2006.
[24] Queensland Electoral Rolls, 1926.
[25] Queensland Electoral Rolls, 1924-1938.
[26] Queensland Electoral Rolls, 1939-1974.
[27] Author's conversations with Jack Ross.
[28] Raymond Evans, *A History of Queensland*.
[29] Author's conversations with Jack Ross.
[30] Ken Mackay entry, *Australian Dictionary of Biography*.
[31] *Courier Mail*, 6 August 1937.
[32] Queensland Register of Birth, Deaths and Marriages.
[33] Baptism records, St. Patrick's Catholic Church, Toowoomba.
[34] Memorandum to Master J. F. Ross, Commonwealth Public Service, 20 January 1938.
[35] Letter to J. F. Ross from Deputy Director, Posts and Telegraphs, PMG's Department, 2 September 1938.
[36] *The Telegraph*, 31 March 1939.
[37] Notification of employment as a telephonist at Brisbane in the PMG's Department, 26 February 1941.
[38] Letter from Deputy Director, Posts and Telegraphs, PMG's Department, 10 September 1941.
[39] World War II service records, John Francis Ross, National Archives of Australia.
[40] Radar entry, Dictionary of Sydney website.
[41] Radar, CSIROpedia website.
[42] *HMAS Kuttabul*, The Fleet, Australian Navy website.
[43] Application for position of Divisional Engineer, 3rd Division, Broadcast Transmitter Division, Adelaide, 31 March 1959.
[44] Recollections of Bryan Ross.
[45] Raymond Evans, *A History of Queensland.*
[46] Radio in Queensland, Queensland Historical Atlas website.
[47] Application for position of Divisional Engineer, 3rd Division, Broadcast Transmitter Division, Adelaide, 31 Mar 1959.
[48] Confirmation of provisional promotion to Cadet Engineer, 3rd Division, Engineering Branch, PMG, 21 May 1948.
[49] *Commonwealth Gazette*, 23 July 1953.
[50] Academic record, Registrar of the University of Queensland, 96/1967.
[51] Letter of approval for advancement as Engineer Grade 1, 3rd division, PMG, 14 January 1953.

[52] Background document for Order of Australia referees, 1988.
[53] Police accreditation pass, 1954 Royal Visit, 5 February 1954.
[54] *Longreach Leader*, 10 December 1954.
[55] Doug G Sanderson, *On Air – History of National Stations in Queensland to 1988*, 1988.
[56] Letter requesting admission as a Justice of the Peace, 26 January 1956.
[57] Application for position of Divisional Engineer, 3rd Division, Broadcast Transmitter Division, Adelaide, 31 March 1959.
[58] Background document for Order of Australia referees, 1988.
[59] Application for position of Divisional Engineer, 3rd Division, Broadcast Transmitter Division, Adelaide, 31 March 1959.
[60] Letter from the Superintendent of the Personnel Branch, PMG's Department, confirming the promotion in Adelaide, 20 June 1959.
[61] John F Ross, *A History or Radio in South Australia 1897-1977.*
[62] Letter from the Assistant Director (Engineering) of the PMG re installation of 5AN/5CL at Pimpala, 19 September 1961.
[63] Notice of Meeting, Adelaide Division, Institution of Radio Engineers, 15 August 1961).
[64] Notice of Meeting, Adelaide Division, Institution of Radio Engineers, 23 October 1961.
[65] Letter from the PMG's Assistant Director-General (Radio) to Vernon Kenna, Federal Controller of Technical Services, ABC, February 1965.
[66] Degree certificate, Pacific International College of Arts and Sciences, Los Angeles, California, USA, 1967.
[67] Student's Record, Pacific International College of Arts and Sciences, 25 July 1967.
[68] John F Ross AM, *Radio Broadcasting Technology, 75 years of Development in Australia, 1923-1998*.
[69] Anthony Curtis, *Shortwave Radio and the Voice of America,* University of North Carolina, 2011.
[70] Jack Ross diary of United States trip, 1967.
[71] John F. Ross AM, *Radio Broadcasting Technology, 75 years of Development in Australia, 1923-1998.*
[72] Notification of elevation to Fellow, IREE Australia, 23 February 1970.
[73] IEEE Fellow Grade History, Institute of Electrical and Electronics Engineers website.
[74] Letter for approval to publish a textbook, Commonwealth Public Service Inspector for South Australia, 2 February 1971.
[75] *Telecom journal*, No. 61, Adelaide, March 1981.
[76] 2004 Monash Medal citation for Mr John F Ross, Institute of Electrical and Electronics Engineers.
[77] Photograph, engineering Section, PMG's Department, 23 November 1973.
[78] Program of the opening of the Telecommunications Museum, Electra House, 31 July1978.
[79] John F. Ross, *A History of Radio in South Australia 1897-1977*, Adelaide, 1978.
[80] John Kulm, *Amateur Radio Action*, Vol. 12 No 11, 20 February 1990.
[81] John F Ross AM, *Radio Broadcasting Technology, 75 years of Development in Australia, 1923-1998.*
[82] Mount Laura Station, National Trust of South Australia website.
[83] J. F. Ross, *A History of Telecommunications on Stamps*, Vol. 1-5, Harry Hayes, UK, 1976-78.
[84] *Stamp Monthly*, May 1976.
[85] Letter to the Managing Director, OTC, 1 April 1987).
[86] Letter of acceptance, Public Relations Manager, OTC, 20 May 1987.
[87] Letter from Murray Coleman, State Manager of Telecom, 6 March 1981.
[88] Photographs of ABC interview, Electra House, 1 July 1982.
[89] Certificate of Appreciation, Rotary Club of Brighton SA, 4 February 1982.
[90] Letter of thanks, Honorary Secretary, National Trust of SA, 25 November 1982.
[91] Letter of appreciation, Secretary, Telecommunication Society of Australia, 14 October 1983).
[92] Application for the position of State Broadcasting Manager, 7 November 1983.
[93] Letter of approval for promotion to State Broadcasting Manager, Director of Broadcasting, Telecom Australia, 19 December 1983.
[94] Photo of opening ceremony, Radio Australia reopening, October 1984.
[95] Peter Lucas, $10 million boost for Radio Australia, *Scan* magazine, 12-25 November, 1984.
[96] Notification of course completion from the Darling Downs Institute of Advanced Education, Toowoomba, 31 December 1984.
[97] Background document for Order of Australia referees, 1988.
[98] Eighth National Conference program, National Film and Sound Archives, 8-11 May, 1987.
[99] Letter to the staff of the Broadcasting Directorate, Telecom, 30 November 1987.

[100] Letter of appointment to the Order of Australia from the Official Secretary to the Governor-General, 19 January 1989.
[101] Letter of congratulations on the Order of Australia, President of the Institution of Engineers Australia, Canberra, 1 February 1989.
[102] Letter of congratulations, Director, National Film and Sound Archive, 3 February 1989.
[103] Letter of congratulation, Australian Film Television and Radio School, 7 February 1989.
[104] Letter to the Private Secretary, Government House Sydney, 6 May 1989.
[105] Invitation from the Order of Australia Association, 9 February 1989.
[106] *The Broadcaster*, July 1987.
[107] Letter of appreciation, Les Rogers, General Manager, Broadcasting of Telecom Australia, 11 October 1994.
[108] Jack Ross, *Hydroponic tomato production, 1998*.
[109] Jack Ross, *The World of Orchids,* 2001.
[110] Sir John Monash entry, *Australian Dictionary of Biography*.
[111] ASRA Award for Excellence 2009, *Australasian Sound Archive*, No. 35, Winter 2010.
[112] The J. F. Ross Archive Collection relating to broadcasting technology in Australia, Powerhouse Museum Sydney website.
[113] Statement of subject results, Matriculation Examination, Public Examination Board of South Australia, 1971.
[114] Marriage Certificate, Commonwealth of Australia, 14 May 1969.
[115] Letter of reference, St John's Regional School, Sisters of Charity, Auburn, December 1969.
[116] Diploma in Fine Art Sculpture, South Australian School of Art, April 1973.
[117] Declaration of change of name, Deputy Registrar-General of Deeds, South Australia, 24 January 1973.
[118] Denise Gaugwin and Mike Smith, Obituary for Betty Ross, *Australian Archaeological Association Journal*, 2014.
[119] Bachelor of Arts Degree certificate, Australian National University, 1978
[120] Curriculum Vitae, Betty Frances Ross, Tasmania.
[121] *Minerawuta (Ram Paddock Gate*), Betty Ross, 1980.
[122] *Aboriginal and historic places around metropolitan Adelaide and the south coast*, Edited by Betty Ross, 1984.
[123] *Hindmarsh – heritage of a township 1838-1938*, edited by Betty Ross, 1986.
[124] Decree Nisi of Dissolution of Marriage, Family Court of Australia, 30 September 1986.
[125] Curriculum Vitae, Betty Frances Ross.
[126] Passport visas for Malaysia, February 1991 and November 1991.

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References

Raymond Evans, *A History of Queensland*, 2007.

National Library of Australia – Historic Australian Newspapers 1803 – 1954.

Queensland Electoral Rolls 1860-1900, 1903 to the present.

Queensland Registry of Births, Deaths and Marriages.

New South Wales Registry of Births, Deaths and Marriages.

Queensland Places website: www.queenslandplaces.com.au.

Susan Addison and Judith McKay, *A Good Plain Cook: An Edible History of Queensland*.

150 Years of Queensland's Economic History: Key Dates, Facts and Figures, Australian Bureau of Statistics Articles, March 2009.

John F Ross, *A History or Radio in South Australia 1897-1977*, Adelaide, 1977.

John F Ross AM, *Radio Broadcasting Technology, 75 years of Development in Australia, 1923-1998*, Port Macquarie NSW, 1998.

Betty Ross (editor), *Aboriginal and historic places around metropolitan Adelaide and the south coast*, Anthropological Society of South Australia Inc., 1984.

Betty Ross, *Minerawuta (Ram Paddock Gate)*, SA Department for the Environment, 1981.

Betty Ross (editor), *Hindmarsh – heritage of a township 1838-1938*, Hindmarsh Jubilee 150 Community Committee, 1986.

Jack Ross, *Hydroponic tomato production*, Casper Publications Pty Ltd, Narrabeen, 1998.

Jack Ross, *The World of Orchids*, written 1993, Casper Publications Pty Ltd, Narrabeen, 2001.

Geoffrey Serle, Monash, Sir John (1865–1931), *Australian Dictionary of Biography*, National Centre of Biography, Australian National University, https://adb.anu.edu.au/biography/monash-sir-john-7618/text13313, published first in hardcopy 1986, accessed online 9 March 2023.

Queensland State Archives - Registers of Rations Issued to Immigrants - Maryborough, 1875-1884.

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