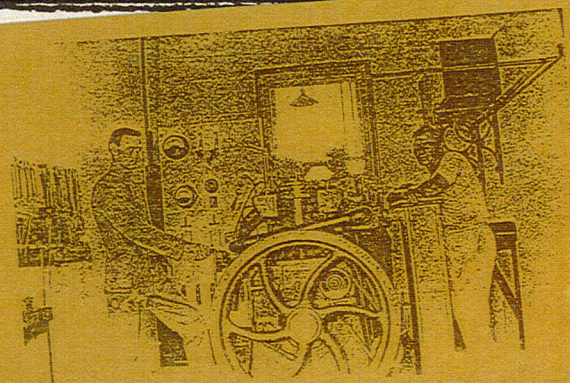
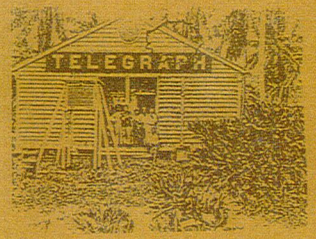
The Beamers

A photographic history of the Beam Radio Service 1927 — 1969





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Preface

BY THE early 1920s, Australia was no longer an isolated British colony; developments in submarine communications cable technology had already allowed Australians to keep in touch with the rest of the world.

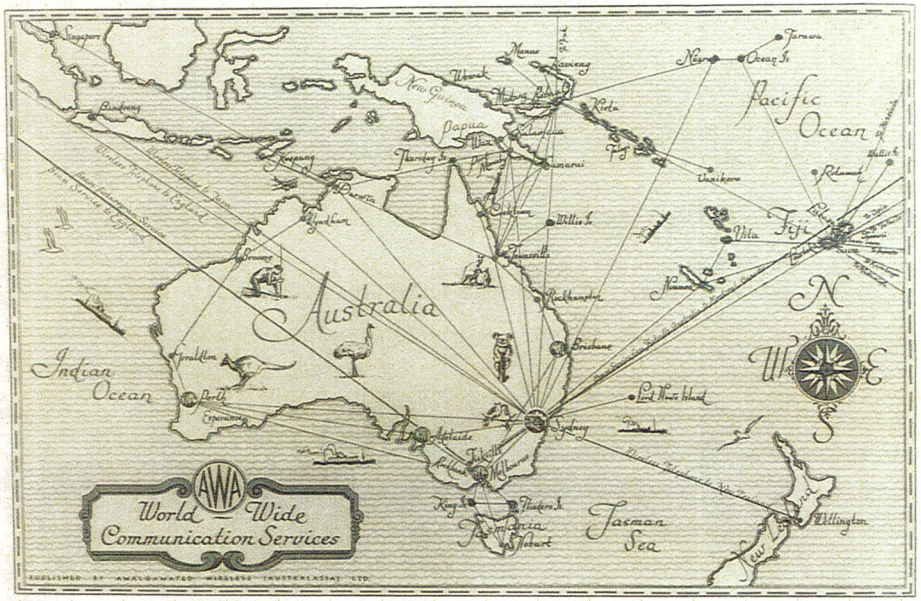
However, it was the development of direct short-wave radio communication with Great Britain which consolidated Australia's place on the world stage.

When OTC assumed control of Australia's international telecommunications services in 1947 (having been established by an Act of Parliament in 1946), the Beam Wireless Service had been operating for 20 years.

Although superceded by more modern technology in the 1960s, Beam Wireless made a major contribution to Australia's social and economic development.

This book is a pictorial history of the Beam Wireless Service in Australia; it is not intended to be a definitive history of radio technology.

Primarily, this book pays tribute to the employees of the Beam Wireless Service, some of whom are still employed by OTC today. Many of the pictures reproduced in these pages have been generously donated to the OTC archives by these former Beam employees; others have been donated by the Overseas Telecommunications Veterans' Association. To both groups, we offer our sincere thanks.



Steve Burdon

S W R Burdon
Group Managing Director
Australian and Overseas Telecommunications Corporation

The development of Beam Wireless

THE ESTABLISHMENT of Australia's first coastal radio station in Sydney, by the fledgling Australasian Wireless Company in 1910, signalled a new era of communication.

Further developments followed when the company built two high-powered stations at Pennant Hills, Sydney, and Applecross, near Perth.

In 1913, Amalgamated Wireless Australasia Ltd (AWA) was formed, assuming the responsibilities of the Australasian Wireless Company.

AWA's Managing Director, Ernest Fisk, believed in the new science of radio and was convinced that one day, direct wireless communication would be possible between Australia and Great Britain.

In 1916, Fisk went to England for discussions with the Marconi company. From these talks it was agreed that radio trials between England and Australia would proceed.

Early in 1918, Fisk received the first long-wave signals from Britain at his home in Wahroonga, Sydney. Further successful trials followed, with the then Australian Prime Minister, Billy Hughes, sending a direct message to Australia from England that same year.

Immediately after these trials, the Marconi Company submitted a proposal to the Australian Government to establish a direct long-wave radio service between Australia and Britain. This proposal was held in abeyance when the British Government established a committee to investigate the feasibility of establishing an Imperial wireless chain. The recommendations from this Committee displeased the Australian Government, which feared being left isolated and vulnerable at the end of the chain.

Experiments were conducted by the Marconi Company in 1920 and 1921 into the strength of long-wave radio signals received at distant places; included was Koo-Wee-Rup near Melbourne. Tests between Koo-Wee-Rup and England proved that direct radio links were possible across the globe.

In 1920, AWA submitted its own proposal to the Australian Government for a direct long-wave radio service with Britain; this proposal was accepted in 1922, following the rejection by delegates to the 1921 Imperial Wireless Conference of the wireless chain proposal.

In accepting the AWA proposal, the Government acquired 50 per cent of the company's shareholding, plus one share. This agreement gave AWA the sole right to construct wireless stations in Australia.

However, a previous agreement struck between AWA and the Marconi Company in 1913 meant that the Marconi Company would be the sole contractor to the necessary radio stations in Australia; AWA would act as the operating company.

During World War I, radio pioneer Guglielmo Marconi had begun experiments into short-wave radio. Later, whilst negotiations and testing proceeded for building a high-powered long-wave wireless station in Australia, Marconi continued his research into short-wave transmissions.

Marconi's experiments between his station at Poldhu in Cornwall and his yacht *Elettra* sailing in the Atlantic, showed that short-waves were less affected by sunlight than long-waves (which travel by the path of maximum darkness), and that the propagation of short-waves was unaffected by intervening land masses.

In February 1924, AWA engineers received a cable from Marconi, asking them to accept signals on the 90-metre wavelength from his Poldhu station in Cornwall. Two test sets were hastily constructed at AWA's Knox Street factory in Sydney, as there was no wireless set in Australia capable of receiving this wavelength.

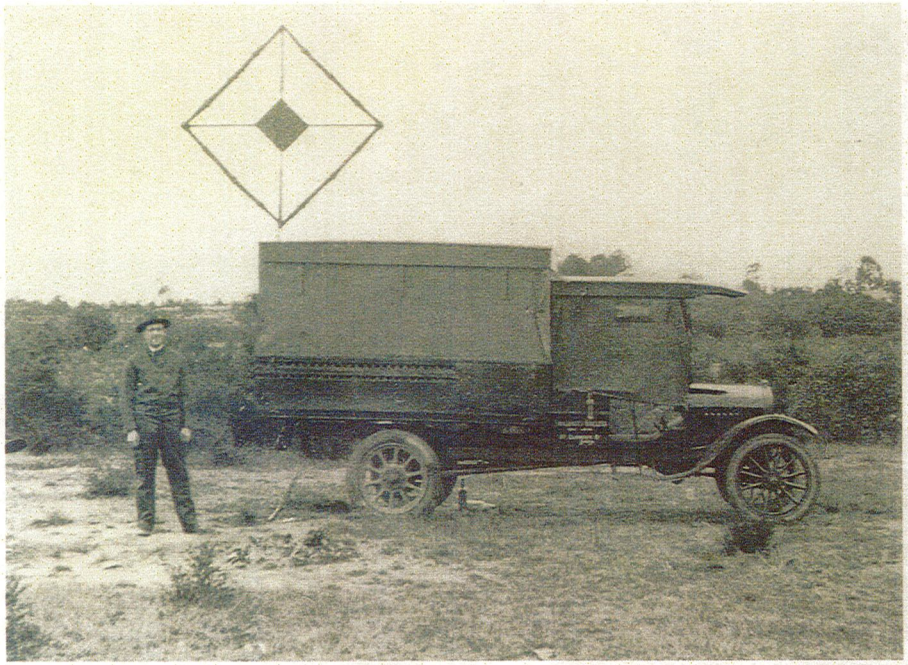
Just before dawn on 6 March 1924, the Poldhu signals were clearly heard by the monitoring team in the Sydney suburb of Willoughby. A whole series of tests began, with shorter and shorter wavelengths, and it was found that the 25-metre wavelength gave the best results.

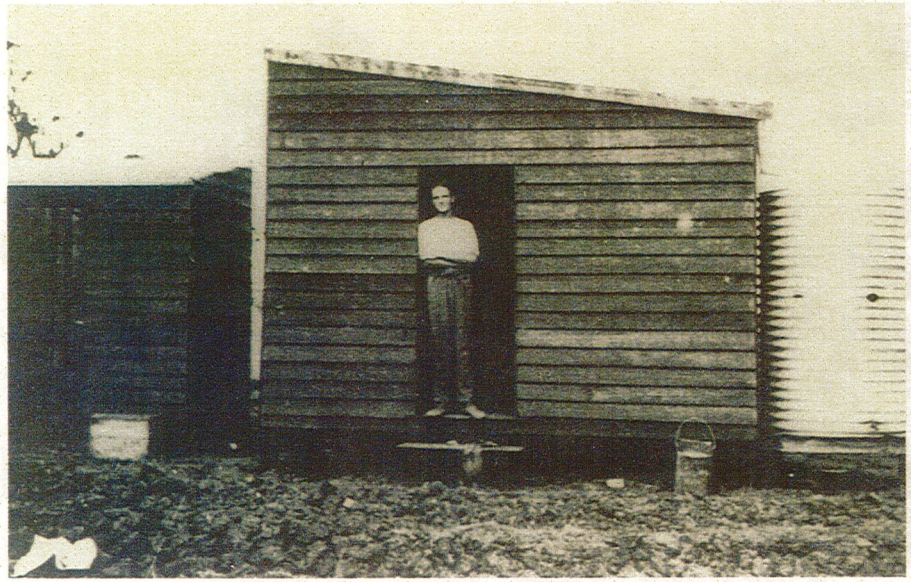
So successful were these trials that, by May 1924, Marconi implemented a series of short-wave telephony trials to Australia. These also proved to be successful.

***Opposite, top*: When testing locations for a site for a high-powered long-wave wireless station in Australia, AWA used a Ford van equipped as a mobile laboratory.**

***Opposite, bottom*: During research into long-wave transmission, AWA erected an experimental receiving station at Koo-Wee-Rup near Melbourne.**

***Far right*: A group of AWA engineers seated in the back of the mobile testing laboratory.**





Beam Wireless comes to Australia

FOLLOWING his successful trials with short-wave radio, Marconi proposed to Commonwealth governments that he provide an Empire wireless service using direct short-wave links.

He promised that such a service would 'operate at 1/50th of the power, three times the speed, and 1/20th the cost of any system currently in operation or under construction'.

The Governments of South Africa, Canada and Australia immediately approved the scheme, and the Australian Government signed a new contract with AWA in which the company would manage the construction and operation of 'a station in Australia which would effect direct wireless communication with Britain and Canada'.

AWA accepted a tender from the Marconi Company to erect two receiving stations and two transmitting stations in Australia; both would communicate with Britain and Canada.

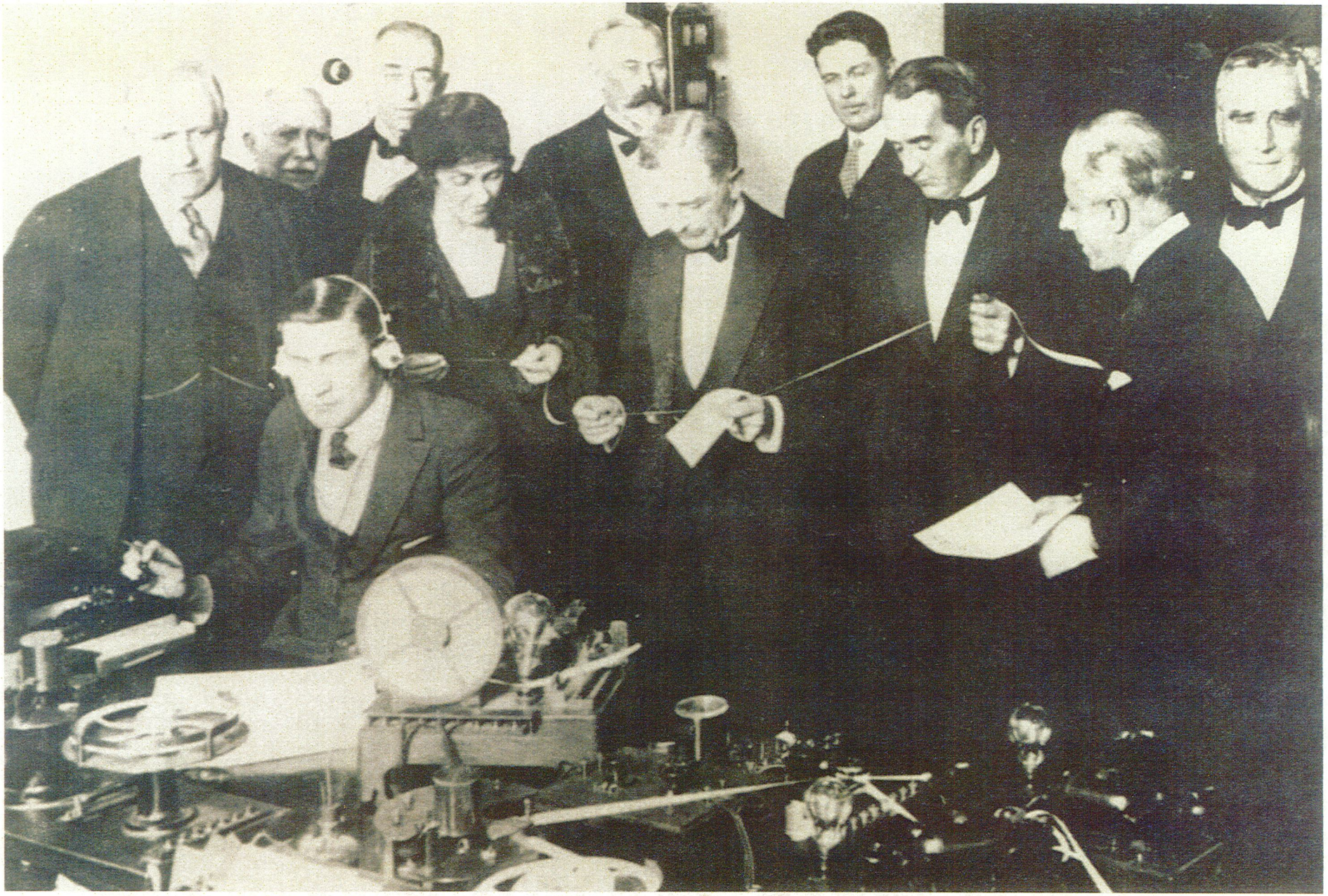
The cost, £119,000, was substantially less than the £500,000 that would have been required to build a long-wave radio station.

Under the terms of this agreement, the Marconi Company was to demonstrate that the completed stations could send and receive messages accurately at the rate of 100 five-letter words per minute over a period of seven hours per day (a duplex capacity of 21,600 words per day). The Marconi Company guaranteed that the new stations would be able to handle double this amount.

In order to select suitable sites for these stations, transmission and reception tests were made at several locations to determine local atmospheric and other conditions.

A site for the transmitting station to both England and Canada was chosen at Ballan (later known as Fiskville) and a site for the receiving stations was found at Rockbank. Both sites were close to Melbourne to allow easy management.

The official opening of the Australia-England Radio-Telephone Service — James Scullin (Prime Minister of Australia from October 1929 to January 1932), in his Canberra office, on 30 April 1930, speaking by radio-telephone to Ramsay MacDonald in London. In the background are former Prime Minister, Billy Hughes (left) and J A Lyons, who succeeded Scullin as Prime Minister. (Photograph courtesy the Sydney Morning Herald.)



Scene in the Melbourne operating room at the official opening of the Beam Wireless service, 1927. E T Fisk, on the right, observes the then Prime Minister, S M Bruce, examining the tape.

The stations communicating with England were capable of transmitting and receiving messages from both directions around the globe, which meant that almost continuous communication could be carried out both day and night.

It was planned that both the receiving and transmitting stations would be controlled from AWA's central office in Melbourne by landline. Messages would be relayed to other capital cities via landline or via feeder stations such as that at Pennant Hills, which was connected to the Sydney Office by landline.

After the Australia-Britain Beam Wireless Service opened on 8 April 1927, the introduction of new applications of short-wave technology continued apace.

On 5 September 1927, Ernest Fisk transmitted the first Empire radio broadcast from Sydney to London. On 31 October the following year, he conducted public demonstrations of two-way telephone links with America.

Within two years, Australia and Great Britain were linked by a public radio-telephone service and in 1934, the photo-telegraph service was introduced on the Australia-Great Britain beam circuit.

In March 1930, Australians honoured Guglielmo Marconi (right) by asking him to switch on the lights at the Radio and Electrical Exhibition in Sydney from his yacht moored in Genoa Harbour.

The Beam Wireless Stations

THE ORIGINAL Beam stations at Rockbank and Ballan had some similarities; one of the most distinctive being the masts.

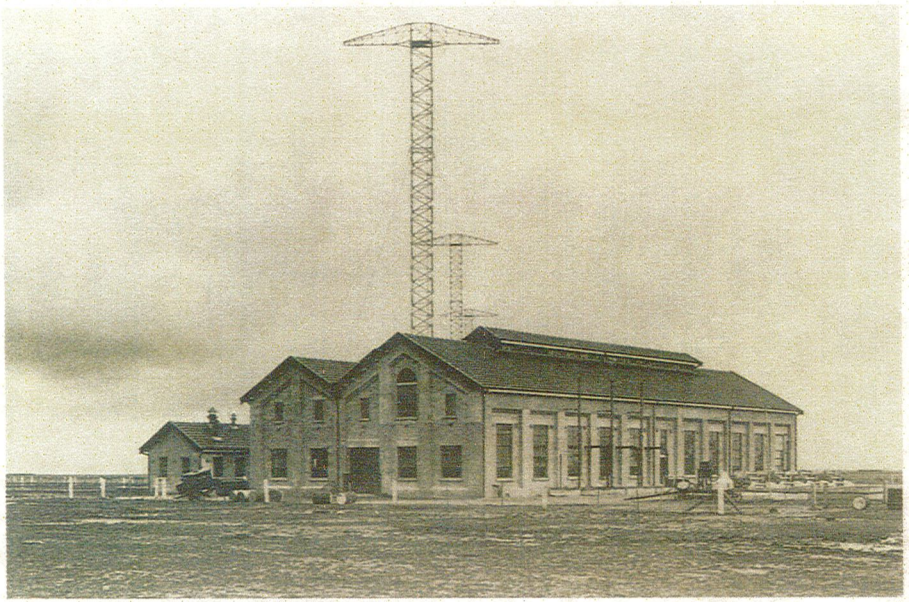
Each station had three masts (known as Franklin masts) placed 195 metres apart, standing 75 metres high, made from lattice steel and weighing 50 tons.

Each mast supported a cross-arm 27 metres in length and was stayed by four wires placed at right angles which were buried in concrete blocks about 33 metres from the base.

Aerials and reflectors were constructed of insulated vertical wires, supported by other wires known as 'Triatics' which were stretched between the horizontal cross-arms of the masts at specific distances apart.

The height of each aerial and reflector was 60 metres, and each had 50 wires attached. Since the aerials and reflectors were of identical construction, they could be interchanged to transmit or reflect signals in different directions.

This meant that the signals could be directed or received via either of the great circle routes, depending on the time of day, with little loss of operating time.



Ballan Transmitting Station buildings c.1930.

Ballan (Fiskville)

THE BALLAN SITE was 10 kilometres south of the town, which is located about 80 kilometres from Melbourne.

Staff quarters were completed at Ballan in 1927, and comprised eleven cottages for married staff and a substantial building to be used for bachelors' quarters. All cottages were supplied with electricity and hot and cold running water.

Although, initially, conditions were not ideal, with flood rains followed by drought, the community flourished. The roads were soon improved, most families owned a car, and telephones and radiola 'supers' lessened the isolation.

AWA built a recreation hall and purchased a pianola for its employees. In their leisure time, staff and their families played tennis or golf; some took up hunting. The Ballan Social Committee organised regular picnics, which were sometimes attended by Beam staff from Melbourne or Rockbank.

In 1933, the name Ballan was changed to Fiskville and the small community opened its own school, built to take 32 pupils.

The transmitting station itself included a power house, which was equipped with three large crude oil engines, each having three cylinders which drove an electric generator.

The power from these generators was taken to a switchboard which operated other machines.

The transmitter produced a current alternating at the rate of 11,600,000 times per second which was fed to the aerials. The plate circuits of the transmitter required 10,000 volts to operate them, produced by passing an electric current to a transformer and on to a rectifier consisting of sixteen valves — each about the size of a football — mounted on slabs of glass on a rack.

As the Beam Wireless Service expanded and technology advanced, the Ballan station grew with a series of modernisation programs.

The original aerials were replaced by ones of a more modern design and a workshop was opened to allow new parts to be manufactured on site.

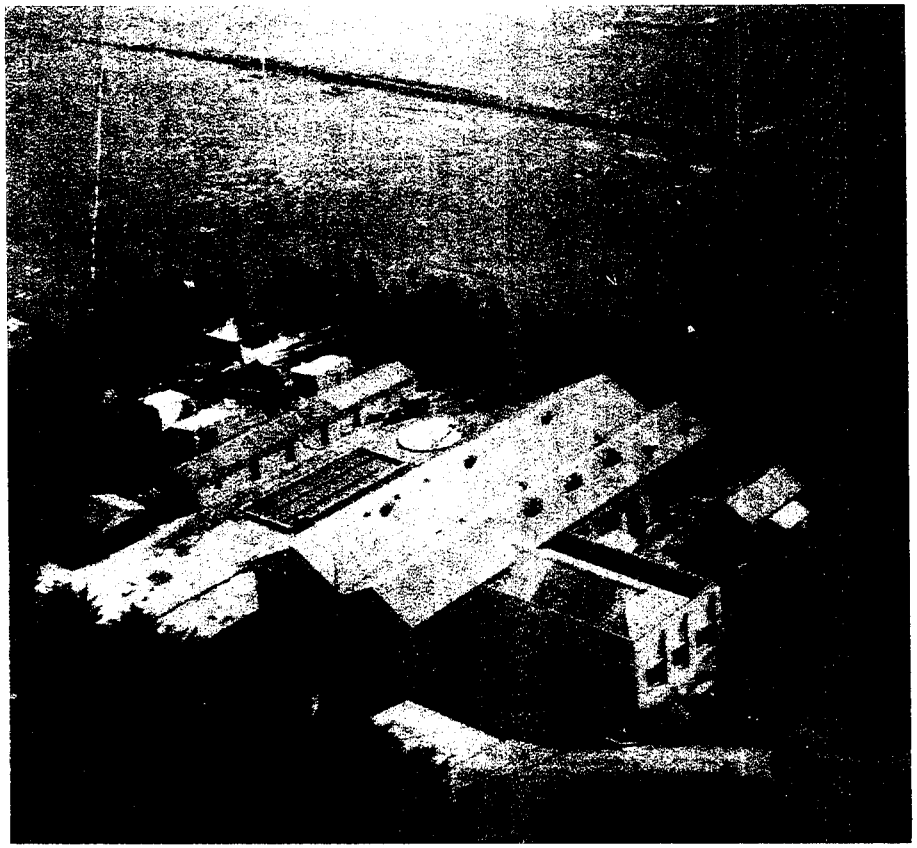
In 1933, the Number 3 transmitter was converted to 20 kw by installing CAT 2 valves. By 1939, all the original Marconi type glass valves were replaced by Radiotron types, and transmission tests were conducted to Sydney using three frequencies on a 24-hour basis.

In May 1941, the auxiliary power plant was abandoned in favour of mains power which supplied the station quarters, lighting and auxiliary functions. In December the same year, the 3 V.E. diesel engines were closed and transmitters were operated off mains power.

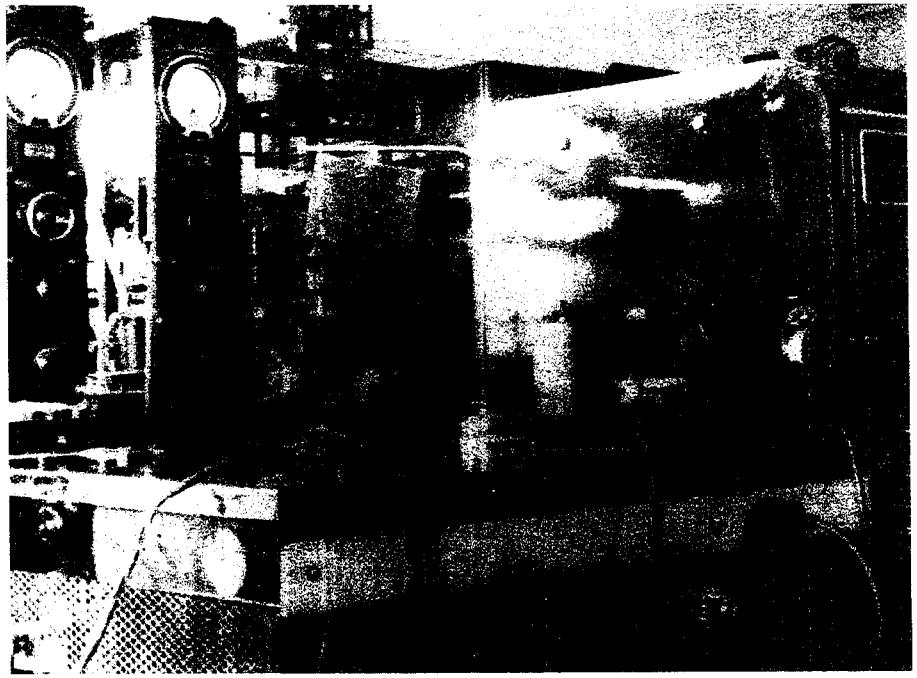
With the onset of World War II, the Ballan workshop was expanded to make high-speed telegraph apparatus for both the Beam Service and the armed forces. Five instrument makers were employed.

In 1946, the buildings were further altered. Changes were made to the interior and the equipment after OTC took over the station in 1947, but the historic No 1 transmitter continued in service until November 1960.

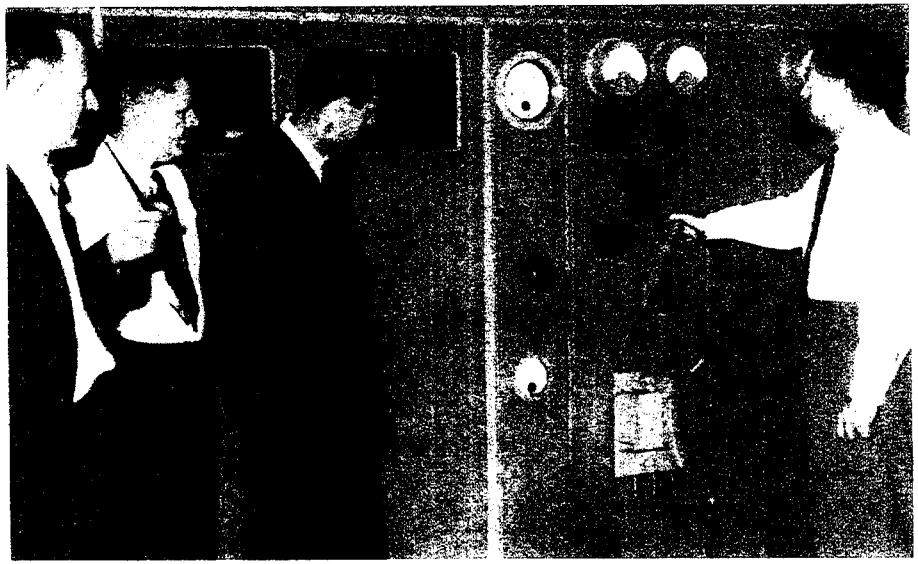
The Fiskville station closed on 31 May 1969.



The Beam Wireless Transmitting Station at Ballan c.1928.



Original transmitter control panels, Ballan, c.1927.



Switching off the historic No 1 transmitter at Fiskville, 14 November 1960.

Rockbank

THE RECEIVING station building at Rockbank, 24 kilometres north-west of Melbourne, was much smaller than the transmitting building at Ballan, mostly due to the fact that the enormous power needed to run the transmitters at Ballan was not required.

One staff member wrote: 'Here there is no bluster of shrilling machines; no noisy powerhouse, no atmosphere of unleashed, untold energy. Here is a purposeful silence — a sense of listening; even the building crouching at the feet of the mighty aerial masts seems to be huddling there with its finger on its lips'.

Lead-in systems from the aerials terminated in a special room housing the receivers which, by 1934, included one each for British traffic, Canadian traffic, the Picturegram Service and a spare.

The signals were picked up, magnified, and passed by landline to the Melbourne or Sydney offices.

As the Beam Service expanded, so did the receiving facilities at Rockbank. Between 1935 and 1947, several new arrays of aerials were erected for work with Montreal, Port Moresby, San Francisco and the new relay stations at Perth, Colombo, and Bombay.

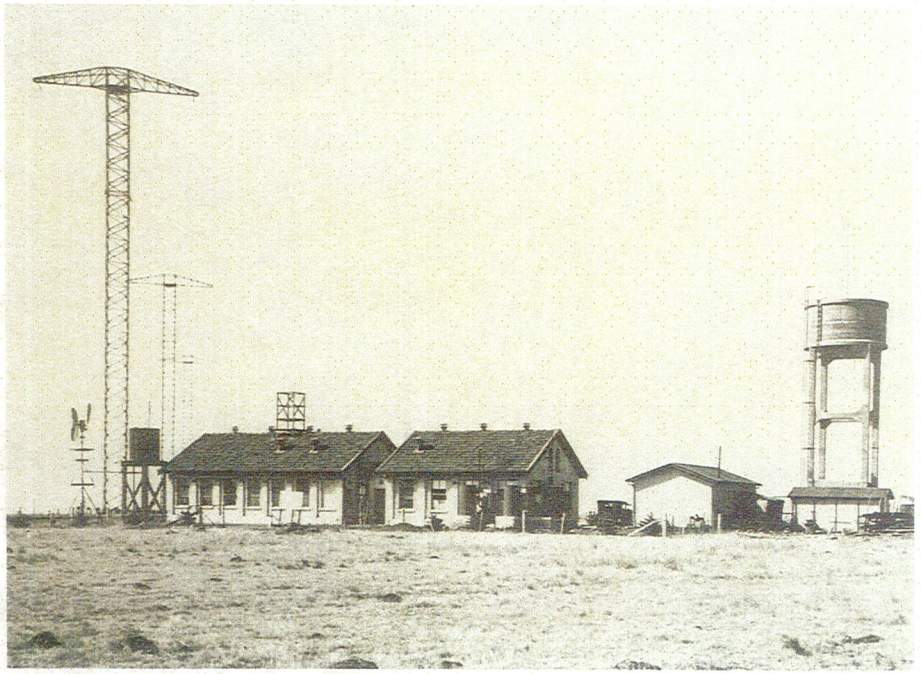
Staff housing was completed in 1926, with four cottages for married staff and a large single mens' quarters, all equipped with electricity and running water.

In 1935, six additional above-ground water tanks were supplied and a petrol pump was installed at the station for staff cars.

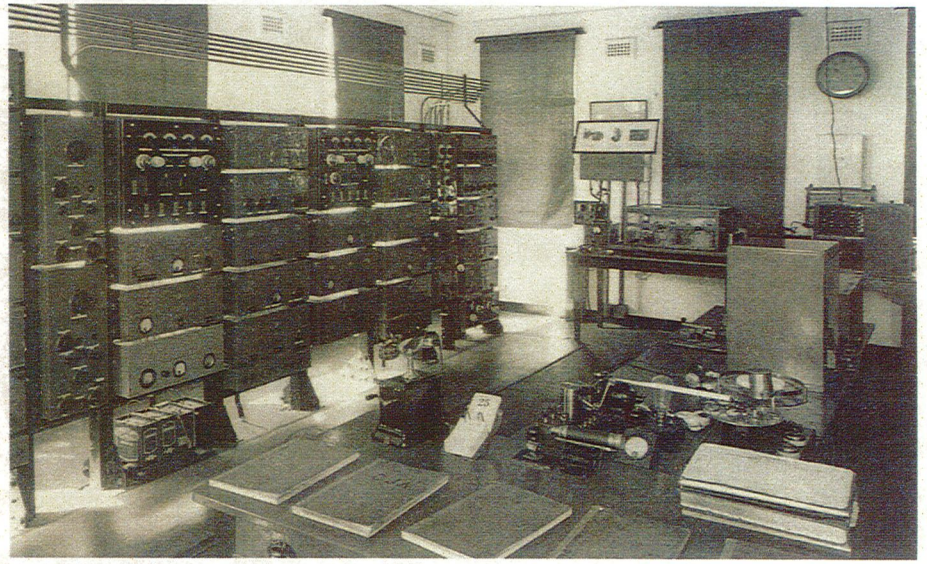
By the 1950s, Rockbank had become part of Melbourne's suburbia, with land being subdivided and much house-building taking place in the area.

As new technology was introduced, Rockbank's role in overseas telecommunications services diminished.

The station finally closed its doors in May 1969.



Rockbank Beam Wireless Receiving Station c.1930s.



General view of the receiving room, Rockbank, 1937.

Rockbank was chosen as the site for scenes from the Stanley Kramer Productions film 'On the Beach' in 1959.

The Beam comes to stay

DESPITE the predictions of many skeptics, the Beam Wireless Service proved to be a resounding success. Within a few months of the service opening, it was carrying almost half the telegraphic traffic between Australia and Great Britain.

The cable companies had been complacent throughout the developments in short-wave radio, and were not prepared for the effects that the Beam Service had on their operations.

Capital costs of the Beam Service were only one tenth that of the cable companies, and Beam's operating costs were substantially lower. The Beam Service could therefore afford to set its rates at almost half that of the cable companies', with the result that many cable companies were driven to the point of collapse.

In 1928, representatives from Commonwealth Governments were called to an Imperial Wireless and Cable Conference in London, at which the Eastern Telegraph and Associated Telegraph Companies, and the Marconi Company, announced that they had merged their interests.

The result was the formation of a holding company and a communications company which was to be known as Imperial and International Communications Ltd.

At the conference, the Imperial Communications Advisory Committee was established, to oversee questions of policy and the setting of rates.

It was argued that cables still had a strategic role to play, both as a back-up service and in defence, as they offered a secure means of sending messages.

Following the conference, there was greater integration between the cable and wireless services. In 1934, Imperial and International Communications Ltd became known as Cable & Wireless Ltd. Financial arrangements were further reviewed at an Empire Rates Conference in 1937, where a uniform ordinary rate was set.

The Beam Radio Service continued to increase its share of the market. By 1934, 14 million words passed over the Australian circuits, rising to 51 million words during 1942. This reflected not only increased demand, but also the introduction of a greater range of services to an increasing number of destinations.

By 1946, AWA believed it had saved the country hundreds of thousands of pounds because of its efficient and inexpensive method of communication.

The Beam Wireless Service, seen by some as a reckless gamble, had proved itself, beyond doubt, as the communications miracle of the age.

'Via Beam'

RULES and regulations relating to the sending or receiving of messages via the Beam Service were detailed in handbooks available to the public, and customer service clerks were available at each central Beam office to provide customers with information.

The Beam offices operated around the clock. Outward messages could be lodged at any Post Office or handed over the counter at the Beam offices in Melbourne and Sydney.

Telegrams lodged at more remote Post Offices were transmitted to the GPO in the nearest capital city and forwarded to the central Beam offices.

In the central business districts of Melbourne and Sydney, messenger boys were dispatched around the clock delivering and collecting messages. Messages could also be telephoned to the nearest Beam office.

Once lodged at the Beam office, messages were sorted and then passed to telegraphists who converted them to perforated tape. Once completed, the tapes were rolled up, timed and signed by the telegraphist, who gave them to a second telegraphist or 'checker' who checked them for errors using a transmitter slab and sounder.

Errors were re-punched and the original tape was patched. Once deemed correct, the tapes were passed to the senior telegraphist on circuit duty, who transmitted them to Fiskville.

Messages travelled from Fiskville at a rate of 297,600 kilometres per second; since they were transmitted at 1250 letters per minute, it took only one minute for a message of 250 coded words to reach London. In order to keep traffic flowing, several telegraphists were on duty at any one time.

By 1940, tapes were transmitted using high-speed perforators, which dramatically increased the rates of transmission.

Incoming messages were received at the Rockbank receiving centre and passed by landline to the Melbourne beam office. Sydney traffic was automatically transferred to the Sydney beam office.

Messages were received on undulator tape which was gummed onto sheets on a brown paper pad, initialled and timed. Tapes were then transcribed by a second telegraphist onto delivery forms, and a carbon copy was made.

The messages were checked and passed to the circulation clerk, ready for delivery. All the undulator tapes received in a twenty-four hour period were checked against all copies of transcribed messages. Operators making more than twelve mistakes a year were in danger of forfeiting their next pay increment.

In 1945, new equipment was installed in central Beam offices. Reperforators were introduced, through which incoming messages were received onto tape at 80 words per minute and checked by the senior telegraphist. This tape was then fed through an automatic printing machine, where the message was printed onto gummed tape which was then fixed to a message form.

An office copy of the final message was made by placing a damp piece of flimsy paper over the message and passing them through a roller which pressed the original image onto the flimsy.

After checking, the messages were delivered. Until 1948, in the central business districts of Sydney and Melbourne, they were delivered by messenger boys either on foot or bicycles. Messages outside these areas were delivered to the central Post Office for mailing.

At work in the Sydney operating room, York Street, during World War II. (Photo courtesy of OTVA member Ron Waugh.)

The 'Beamers'

BEFORE inauguration of the Beam Service, Morse telegraphists were drawn from the Post Office, Coastal Radio Service, cable offices and AWA's Marine Service. A select group of twenty-two men was sent to London to undertake advanced training.

Seven of the group were chosen as trainee operators who served their time in the Central Radio Office in London; the remaining fifteen were sent as trainee technicians to the Marconi Wireless College. (In later years, new recruits were trained by the Marconi School of Wireless operated by AWA or by OTC's Telegraph Training School.)

On their return, these men took up positions either as technicians at the new Beam stations, or as supervisors in the Beam operating rooms in Melbourne or Sydney.

Telegraphists were responsible for transcribing outgoing messages onto tape for transmission via Fiskville, or deciphering incoming messages from Rockbank.

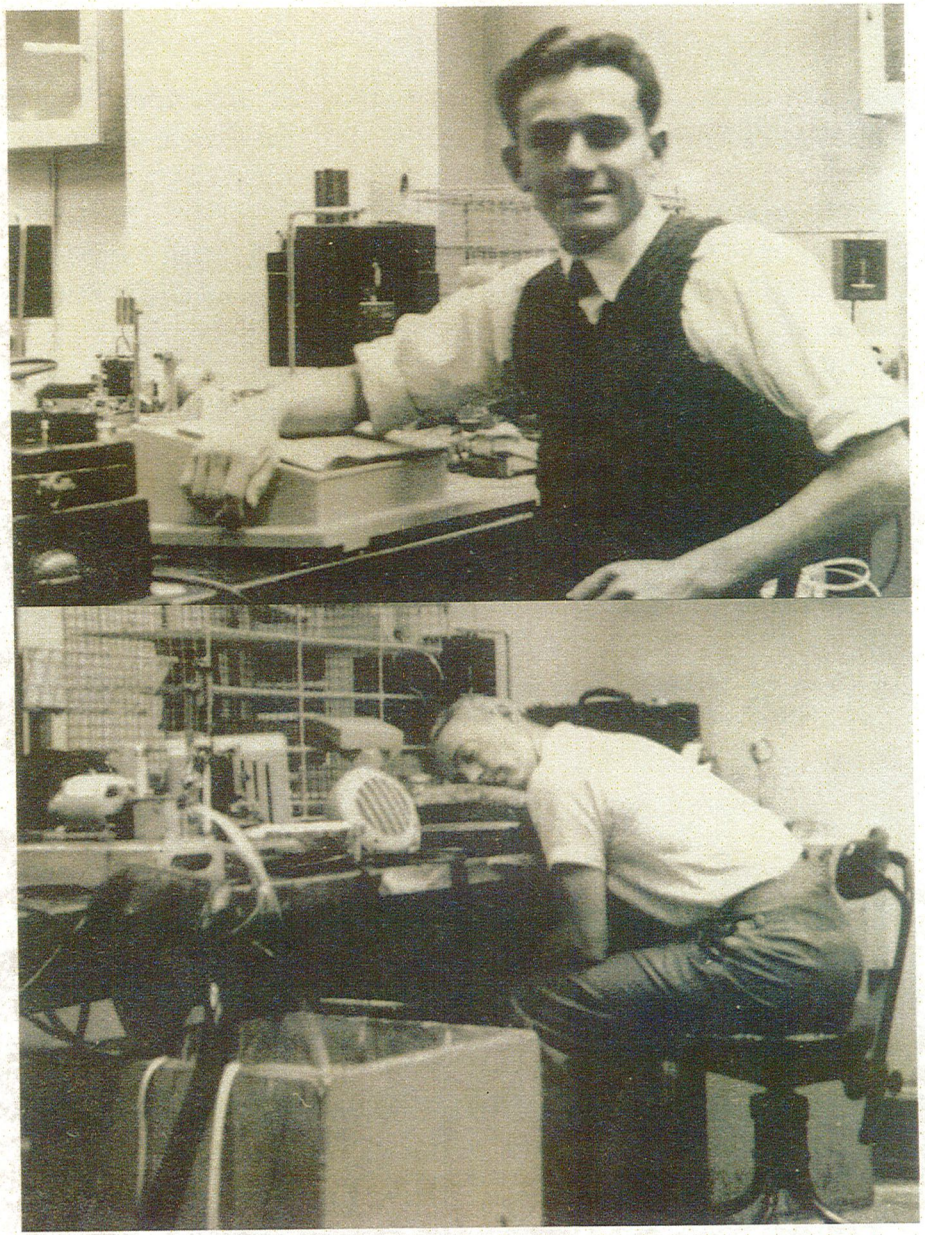
The company set high standards for its service, and undetected errors later discovered by the supervisor on duty would be subject to a 'please explain' note; twelve notes a year could mean forfeiture of next year's pay increase.

A number of clerical positions also existed in the Beam offices including counter clerks, who accepted messages for outward transmission and calculated transmission charges; circulation clerks, who sorted the messages into pigeon holes by destination and category; service clerks, who tracked down any mislaid messages; adrema clerks who prepared addressograph plates; and despatch clerks who coordinated delivery and collection of messages.

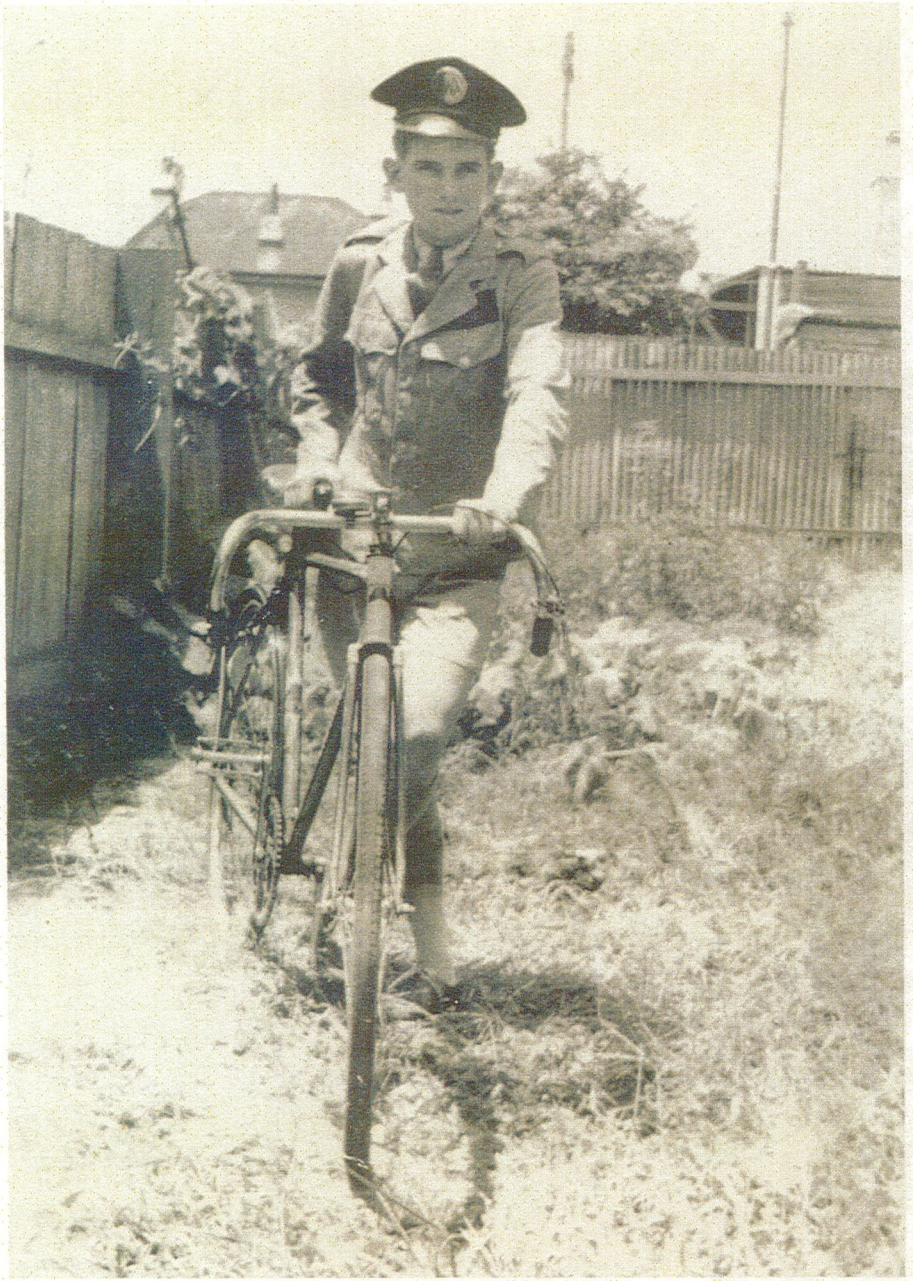
The youngest employees of the company were the Beam messenger boys, who were recruited at fourteen and employed until they were sixteen years of age.

During their two years with the company, they attended night school, and if they achieved sufficient qualifications, could go on to train as telegraphists or undertake an accounting course.

After OTC took over the international telecommunications services in Australia in 1947, responsibility for the delivery and collection of messages passed to the Postmaster General's Department.



Above: **Bob Reekes, radio operator, Sydney operating room, York Street, during World War II. (Photo courtesy of Ron Waugh.)**
Below: **Asleep on the job! Wilf Atkin, takes a well-earned break between shifts.**



Beam messenger boy, Ernest Anthony, in summer uniform with company bicycle, 1942.

Beam messenger boys, Melbourne, 1927.

The Beam Messenger Boys Parade at the AWA Melbourne Office Ball, June 1936.

Picturegrams

THE FIRST test of picture transmission between Sydney and London was carried out by Ernest Fisk in 1929, when he successfully transmitted a series of photographs of himself, British Prime Minister Ramsay MacDonald, and newly-elected Australian Prime Minister, James Scullin.

In 1934, the Picturegram Service between Australia and Great Britain commenced operations and was hailed as an immediate success by members of the press and public alike.

When the service first opened, transmission was by the Constant Frequency Variable Dot method, which used a rotating spot of light to scan the picture. In 1941, the Sub-Carrier Frequency Modulation method of picture transmission was introduced.

In its first year of service, 14 pictures were received in Australia from London and 41 were transmitted. By World War II, the number of transmissions had increased dramatically, with 1486 being sent during 1945.

The increased traffic was partly due to the war, but also to the fact that a direct picturegram service between Australia and San Francisco had opened in August 1942, and to Canada in November 1943.

The advent of the Picturegram Service meant that newspaper readers could see the events they were reading about; advertisers could issue pictures of their products worldwide; plans and maps could be transmitted without delay; and copies of sheet music could be sent direct.

The service even played its part in capturing well-known criminals by enabling police to issue photographs of the criminal and his or her fingerprints overseas.

History was made in 1946, when the first colour picturegram was transmitted from England to Australia, featuring the latest fashions by English designers. When Princess Elizabeth and Prince Philip were married in 1947, some 96 phototelegrams (picturegrams) were received from London.

By this time, OTC had taken over the service and had introduced a system of automatically relaying pictures from Melbourne to New Zealand by radio, and by telephone line to the Sydney Beam office.

This method of distribution proved so successful that the Postmaster General's Department installed facsimile equipment in each State capital so that phototelegrams could be distributed quickly and cheaply interstate over the telephone network.

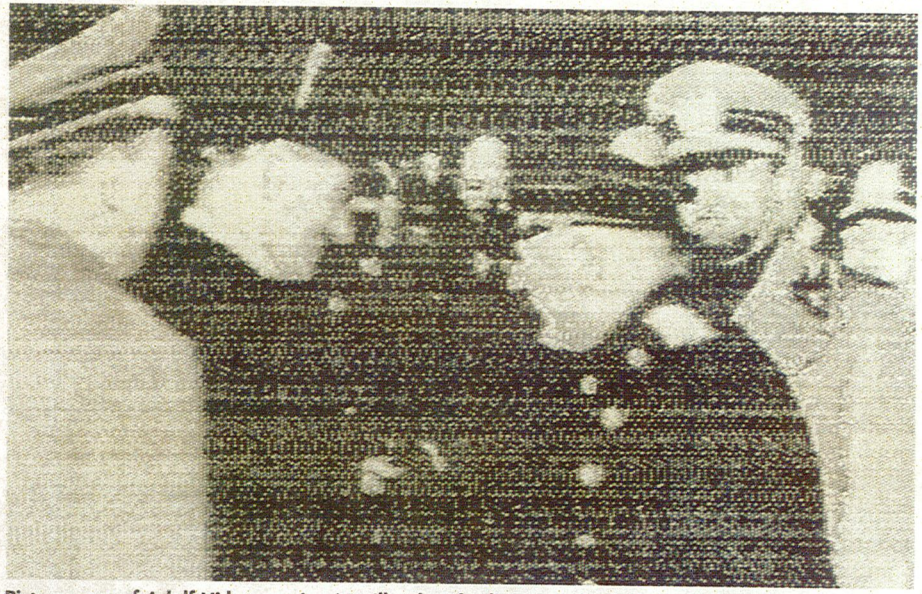
The new equipment could be linked with overseas circuits by automatic relay equipment at OTC's Melbourne terminal.

During the late 1940s and 1950s, the Phototelegram Service began to be used for sporting events, including the 1956 Melbourne Olympic Games, during which 857 pictures were transmitted.

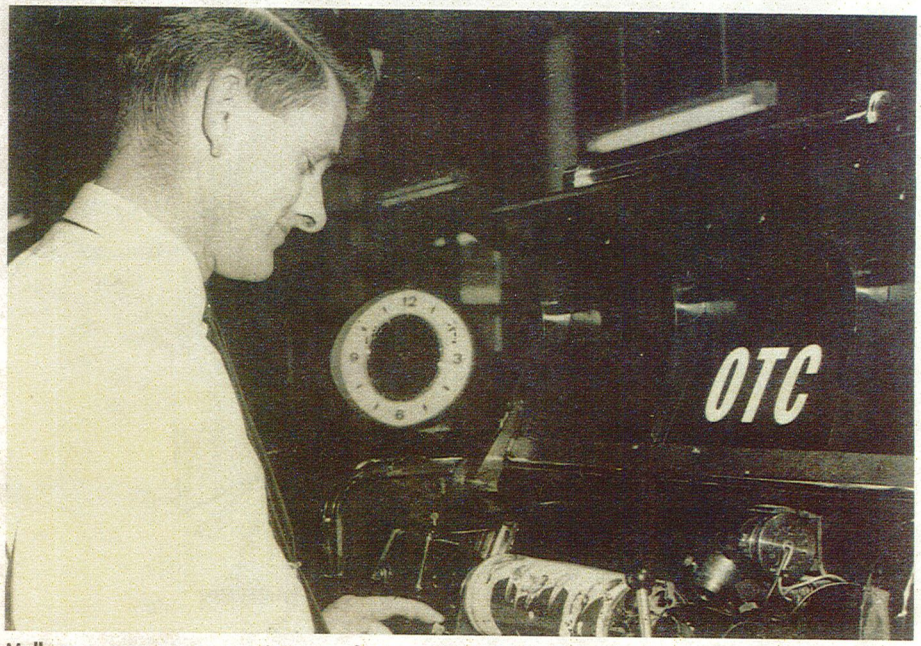
The Phototelegram Service ceased operation on 1 February 1984 to make way for superior technology.

Picturegram of King Edward, the Duke of York, and the Duke of Gloucester at the funeral procession of King George V, 24 January 1936.

The assassination of King Alexander of Yugoslavia, in Marseilles, was the first picturegram to be sent on the Britain-Australia Beam Wireless Picturegram Service and was published in the Australian press on 17 October 1934.



Picturegram of Adolf Hitler meeting Neville Chamberlain in Berlin before World War II.



Melbourne operator transmitting a photograph of OTC's General Manager to London during a public demonstration of the phototelegram service, 1966.

An era of change

WHEN OTC took over Australia's international telecommunications in 1947, costs were rising and traffic figures were falling.

Although international radio circuit traffic began to rise again in 1948/49, the Commission faced yet another problem in the early 1950s: sunspot activity.

Radio circuits were disrupted, and cables had to be used to take the bulk of telegraphic traffic. The cable system proved inadequate, however, and Australia was virtually isolated for a period of several days.

A meeting of the Commonwealth Telecommunications Board in 1951 recommended an investigation of cable networks, and an overhaul by individual national bodies of their radio circuits.

One of OTC's first moves was to combine the operating rooms of the cable and wireless operations in Melbourne. It re-equipped the coastal radio station at Applecross as an international transmitting station and announced plans to build two new international radio stations at Doonside and Bringelly, near Sydney.

These stations would not only take over some of the functions of the Beam Service, but would replace the Pennant Hills transmitting station and all the receiving functions of La Perouse, apart from coastal radio work.

The new stations were equipped with state-of-the-art technology which could deal with periods of high sunspot activity.

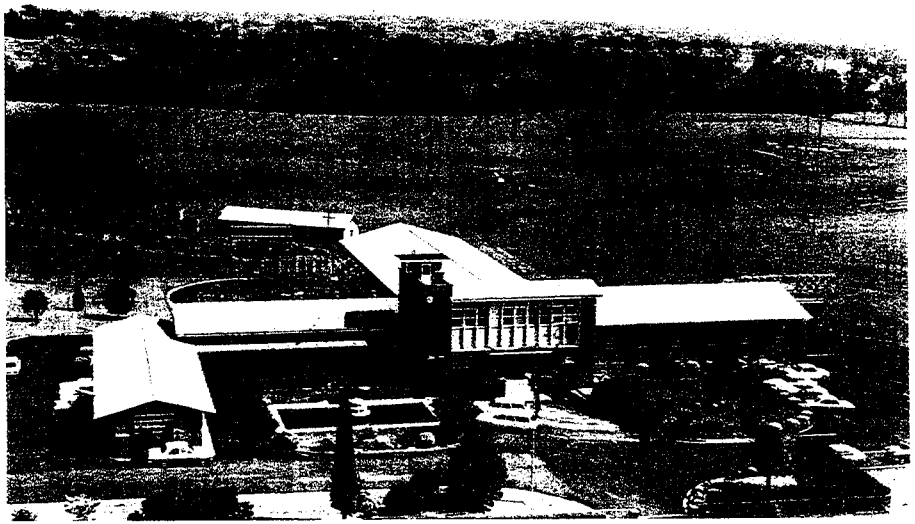
The Fiskville and Rockbank stations were also upgraded with new equipment, and increased circuit capacity on the Melbourne to London and Sydney to San Fransisco circuits paved the way for private companies to lease circuits.

Sophisticated teleprinter error detection equipment was installed in both Melbourne and Sydney in 1956, which could detect errors in the newly standardised 5-unit working code.

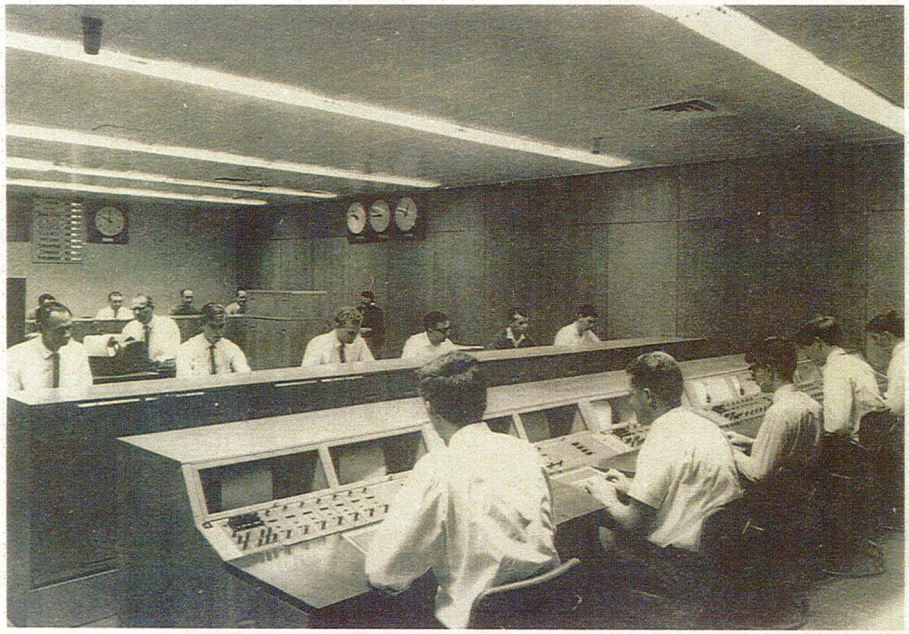
In 1958, OTC installed international telex services to provide direct international customer-to-customer service via teleprinter.

Meanwhile, significant technological advances were being made overseas. In September 1956, the first trans-Atlantic (TAT1) coaxial cable came into operation. In October the following year, signals from the first man-made satellite in orbit were detected by Rockbank and Bringelly.

Receiving room at Bringelly Radio Station, c.1955.



Doonside Transmitting Station, c.1975.



Telex switchboards, OTC International Terminal, Paddington, c.1965.

Keyboard operated cathode ray display units under test and staff familiarisation, Paddington, 1968.

In 1958, a Commonwealth Telecommunications Conference was held in London, where the feasibility of constructing a Commonwealth cable network using new coaxial cables was proposed by the Commonwealth Telecommunications Board.

In 1959, OTC hosted a meeting of representatives from Britain, Canada and New Zealand, where plans were tabled to construct the first section of the Commonwealth cable scheme, a trans-Pacific coaxial cable known as Compac.

Compac would be capable of operating 80 telephone channels, and each could be divided into 22 or more telegraph channels. Two years later, OTC met with heads of Government from South-East Asia to discuss plans for the Seacom cable, a further extension of the Commonwealth cable network.

In 1964, the International Telecommunications Satellite consortium (Intelsat) was formed, with OTC as one of the eleven founding members. Its aim was to develop a global communications satellite system.

Two years later, OTC opened its first Satellite Earth Station at Carnarvon in Western Australia followed, in 1968, by Moree and, a year later, by Ceduna.

In 1969, OTC introduced a computerised automatic relay system at its Paddington terminal, which enabled international telegrams to be handled with increased speed and efficiency. The system used keyboard display units (KDUs) allowing operators to type and edit messages on the screen.

Messages travelled from the KDUs along high-speed lines to the computer, which automatically formatted and stored them in a queue, along with other messages for the same destination. The messages would then be sent automatically over radio circuits or via cable or satellite.

Modern technology had superceded the Beam Service. Although some minor international radio circuits were maintained, a new era had begun.

May 1969 saw the closure of the original Beam Wireless stations at Fiskville and Rockbank.

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**All due care has been taken to acknowledge the original source and/or ownership of photographs. Our sincere apologies to anyone inadvertently omitted from the above list or not credited in the photo captions.*

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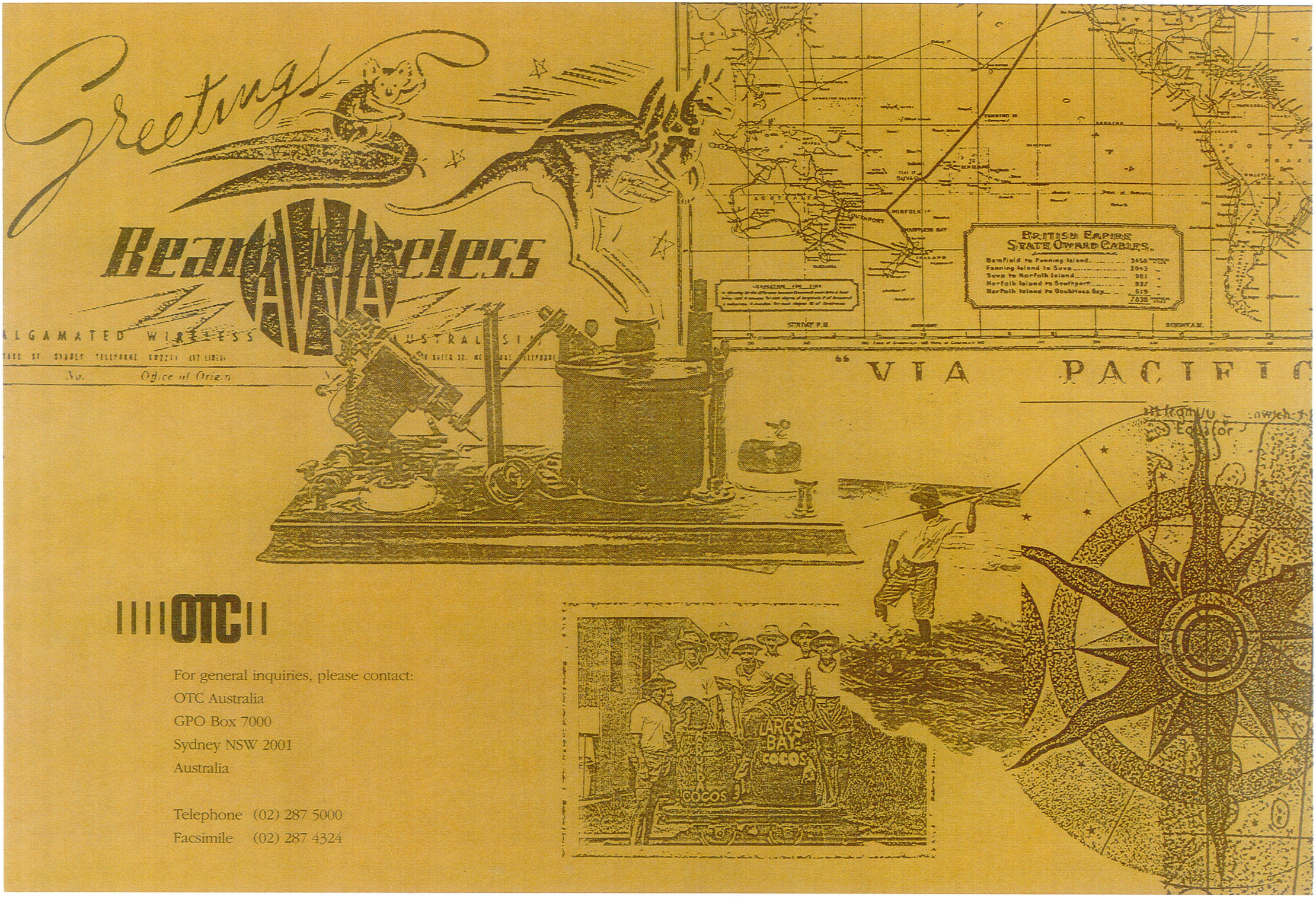

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