

# *The* **BROADCASTER**



Newsletter of Telecom Broadcasting

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6 WF / 6WN PERTH

## THE BROADCASTER

The Broadcaster is the in-house newsletter of Telecom Broadcasting and is published three times a year to inform and recognise the people who make up this organisation.

Articles appearing in *The Broadcaster* do not necessarily reflect the views of the management of Telecom Australia.

Written and photographic contributions are welcome. All material should bear the contributor's name and location and be directed to:

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## EDITORIAL

The article in the last issue of *The Broadcaster*, concerning the 4QY STC 2 kW transmitter and the long life obtained from the 4279Z valve brought a response from a retired Chief Engineer of a Commercial station where a similar transmitter had been installed in 1951.

He said that when he retired in 1971, not one 4279Z had failed in service due to valve deterioration, although the station records showed that three replacement valves had been purchased during his 20 years at the station. Working and spare valves were rotated.

The three valves were purchased as a result of human 'failure'. One brand new valve which had just arrived at the station was taken to the tip with rubbish by the casual cleaner and burnt. He said the cardboard container was so light that he thought it was empty. A second valve was broken when a technician's screwdriver slipped and punctured the valve while attempting to remove a resistor in the cabinet. The third one was broken when the Accountant came to carry out the annual stock take. While holding the valve up to read the serial number the cleaner opened the building door striking the Accountant in the back. The valve didn't even bounce.

JACK ROSS

### Front Cover:

Dual frequency 180m radiator 6WF/6WN (6RN).

### Contributors to this issue:

Leon Sebire	Brian Robb	Ron Holden
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Doug Sanderson	Dave Taylor	Ralph Denison
Bill Gold	David Duffin	David Joseph
Vic Le Pla	Alan Henley	Derek Prosser
Ron Lewis	Murray Fopp	Jack Ross.



## STATION ROLL CALL

### ABV2 MELBOURNE

Station ABV2 is located at Mt. Dandenong, an area now on the tourist day trip itinerary. The hills provide a convenient location for many of Melbourne's communication transmissions, but for the visitor, the area is also noted for its rhododendron gardens, restaurants, reception rooms, scenic lookouts and Sherbrooke State Forest with giant mountain ash, fern gullies and lyrebirds.

ABV2 mainly serves Melbourne with its suburbs spread around Port Phillip Bay to the Mornington Peninsula and Geelong on the Bellarine Peninsula. However, three translators are required to reach viewers less than 8 km away.

Transmissions commenced on 19 November 1956, just in time to cover the Melbourne Olympic Games.

The first transmissions used a 5 kW Marconi transmitter which later became the standby. The main transmitter was an 18 kW Marconi unit featuring high level grid modulation of the two CR191 final tubes. Its useful life came to an end with the introduction of the transistor and colour technology.

Two NEC PCN1013AL 10 kW parallel transmitters were then in service from 1975 to 1991. The facility came equipped with all the necessary control equipment to run auto remote, but this was only to occur in its final years of service. The only vacuum tubes used were in the high power RF stages.

The 1991 version uses two parallel 10 kW NEC PCN1410SSL/1F transmitters, which are fully solid state, multiple redundancy, stereo sound, automatic, remote controlled and unmanned. They originally fed into the 1956 Marconi high gain eight bay aerial with inputs to upper and lower stacks but recently, a new panel system was installed.

Program comes by terrestrial link from the ABC studios at Ripponlea with local satellite reception as backup.

ALAN HENLEY

### 3ABCFM/3JJJ MT DANDEONG

In 1955, part of the newly constructed National TV tower at Mt. Dandenong included a Marconi "bats-wing" 30 kW FM aerial. It took top spot on the tower above the 103 metre platform but was not to see service until the first experimental FM broadcasts in July 1975.

With the introduction of colour, the old Marconi TV transmitter was scrapped but the 3 kW sound section was salvaged by the transmitter staff and converted by them to become Melbourne's first stereo FM service. They also played the records and taped announcements for the first months of test transmissions.

1976 saw the installation of an NEC 10 kW FBN5100B transmitter and soon after with its twin, was configured as main and standby. They fed into the 1955 solid 5" feeder with its expansion joints that were the source of many burn ups over the years before being replaced with 3" flexible co-ax. The old Marconi TV motorised aerial switch was also kept in service providing quick auto change over from main to standby. Because it was a 51.5 ohm device, transmitter staff had to manufacture transitions to match the new 50 ohm transmitters. These transmitters are still operational as backup to the present 3ABCFM Fine Music and 3JJJ ABC Youth Radio services.

Today, both National FM services are 20 kW NEC FBN11K20E transmitters. 3ABCFM on 105.9 and 3JJJ on 107.5 are combined in RFS combiner units and fed to the aerial by 5" flexible feeder.

The main aerial is a Shively 6814, 6 bay, circularly polarised, mounted on the old Marconi pole. The standby is an RFS 903 CP circularly polarised mounted at the 66 metre level, it has one panel on each face of the tower.

ALAN HENLEY



Leon Sebire.

### FROM MY DESK

Earlier this year, when the Australian Telecommunications Corporation and the Overseas Telecommunications Corporation were merged, the former Broadcasting Division became one of six separate businesses reporting to the Enterprises Business Unit with Mr Warren Grace as our Managing Director.

For most Broadcasting staff, this change has little immediate effect. It is still "business as usual" as our business aims, thrusts and customers are very much as before. Then, what is the Enterprises Business Unit at and what are its dimensions and charter?

The Enterprises Corporate Centre is located in Victoria Parade, Collingwood, Victoria. It has a specialist staff of approximately 40 people dealing with the major policy aspects of strategic planning, financial management, human resources and management technologies. As part of Enterprises we form a relatively small component of a group which in total employs about 8,000 people and has an annual revenue of approximately \$2 billion.

It is at our National Office level that almost all of our interactions with the Enterprises Corporate Centre occur. These are primarily concerned with the establishment of our business plans (annual and five year), budgets and accountabilities. Our performance is reviewed monthly under the Business Performance Review process against the agreed targets for the month and the year to date.

All in all, the Enterprises Business Unit sets the goals and directions for each of the businesses in the group and ensures uniformity in the application of thrusts and policies.

This issue of *The Broadcaster* will be the last for 1992 and I take this opportunity to thank all members of staff and our supporters for another very successful year. To all of our readers I offer my very best wishes for a Merry Christmas season and continued health and prosperity in the coming New Year.

Leon D. Sebire  
GENERAL MANAGER

### VISIT BY MR GRACE

Part of the reorganisation following the merger of Telecom and OTC, involved the formation of Enterprises which consists of six lines of business including Broadcasting. In March this year Mr Warren Grace, formerly General Manager of OTC Maritime, was appointed Managing Director of Enterprises. In July, Mr. Grace took the time to meet Broadcasting management and staff from National Office and the Victoria/Tasmania Region. During his address he stressed the importance of taking on board new management initiatives including Total Quality Management, Corporate Benchmarking, Process Re-engineering and Enterprise Bargaining in order to maintain and improve our market share in the new competitive environment. Mr Grace answered questions covering a number of topics in a comprehensive and decisive manner. He described his management aim as supporting the people who work for him and his visit was welcomed by Broadcasting staff.

Sandra Mannings



Mr Warren Grace.

### BARCELONA OLYMPICS

Spectators around the world were mesmerised by the opening and closing ceremonies of the 1992 Olympic Games but few people probably gave much thought to the sound system that delivered the sounds of the spectacle to their ears. But imagine how it would have ruined the show if the microphones suddenly went into mute or a deafening feedback interrupted the opening address.

Designing a sound system for an event like this is incredibly complicated to ensure all 70 000 spectators can hear properly and to accommodate the very high ambient noise from the crowd. At the same time it is important for the speakers to be compact and unobtrusive.

It is for this reason that the production company responsible for the ceremonies brought in one of the world's foremost experts in speaker systems. The company was Bose, an American company. Some of their state-of-the-art technology was described in the March 1992 issue of *The Broadcaster*.

Engineers spent thousands of hours in designing the system and technicians installed and commissioned 151 speakers, 40 amplifiers and 10 system controllers that pumped out over 50 kW of audio power to the spectators during the opening and closing ceremonies at the Olympic Stadium of Montjuic. The systems performed perfectly at both ceremonies and credit must be given to those designers and engineers who have brought large scale sound reinforcement systems to their present state of high quality performance and reliability.

Danielle Smalley

### PETER BRENDAN DEMPSEY

Peter, a member of the Radio Australia Shepparton staff died tragically on the 30th of July 1992 aged 27. He was the innocent victim of a triple shooting in the Melbourne suburb of Burwood.

Peter joined Telecom in January 1983 as a trainee and was promoted to Senior Technical Officer in 1990 working as a shift operator at the Shepparton transmitters. He was working as a Principal Technical Officer in the Melbourne Broadcasting Office, Operations Section on temporary transfer at the time of his death.

Peter was held in the highest regard by all who know him both for his friendly and cheerful nature and for his ability. His funeral in Shepparton, attended by more than 1000 mourners including local workmates and staff from the Melbourne office, was a fitting tribute to a fine young man who will be sadly missed.

Peter is survived by his wife Elizabeth (Liz). Our deepest sympathy to both families and especially to Liz who also lost her sister in the same tragedy.

David Duffin



*A very  
Merry Christmas  
to all Broadcasters*

Artwork by Ralph Denison.

## ORIGINAL BROADCAST FACILITIES

Compared with New Zealand, Australia was a late starter in allowing the broadcasts of Commonwealth Parliament debates. New Zealand listeners had had the opportunity of listening to such broadcasts since 1936 but the Australian Government of the day declined to introduce similar broadcasts on the basis that the broadcasts might encourage public debate or political controversy.

During the years of the Second World War, some members of Parliament had been considering the matter and within one month of the surrender of Japan on 14 August 1945, the Parliamentary Standing Committee on Broadcasting raised the issue of the broadcasting of Parliamentary debates claiming that such broadcasts would 'raise the standard of debates, enhance the prestige of parliament and contribute to a better informed judgment throughout the community on matters affecting the common good and the public interest, nationally and internationally'.

On 19 June 1946, a Parliamentary Proceedings Broadcasting Bill was introduced. Following passing of the Act, the first broadcast was made the following month on 10 July.

The Act provided that the Australian Broadcasting Commission should broadcast the proceedings from:

- a medium wave National Broadcasting Service station in the capital city of each State and in the city of Newcastle.
- such other NBS stations - including the short wave transmitters - as are prescribed upon such days and during such periods as the Joint Committee on the Broadcasting of Parliamentary Proceedings determines.

The Committee subsequently made a number of determinations, one of which allocated the broadcasts of proceedings in the House of Representatives to Tuesdays and Thursdays and in the Senate to Wednesdays and Fridays.

Immediately Parliament gave its approval, there was great pressure to go to air as soon as possible.

The Postmaster General's Department which was responsible for the provision and operation of technical facilities of the ABC had to fast track design, equipment procurement, installation and testing to enable early broadcasting to begin. At the same time, the Department of Interior had to erect the control and equipment rooms.

The design and installation of the facilities was under the control of Eric Watt, Broadcast Engineer of the Department's New South Wales Engineering Branch. The Installation team included Supervising Technician Ken Taylor, Senior Technician Vic Le Pla and Technicians Len Linder, George Hobbs and Maurie Morris.

Because of the poor acoustic qualities of the Chambers, dynamic type microphones purchased for the project proved entirely unsatisfactory due to excessive reverberation. RCA ribbon types with their figure of eight pattern gave much superior performance but as they were manufactured in the USA it was evident that there would be considerable delay in supply. There were a number in use at ABC studios throughout Australia, so decision was made to have all these microphones removed from the studios and dispatched to Canberra. It was 12 months before the replacements arrived from overseas. The facilities installed included 49 microphones in the House of Representatives and the Senate

plus 110 amplifiers. In 1949, when the numerical size of both Houses was increased, the number of microphones had to be doubled, even though members were required to sit closer together than previously.

The microphones were arranged in two rows, and there were four on the table of the House of Representatives for sound reinforcement within the Chamber itself. In this House, the equipment room containing the amplifiers and other technical equipment was in the basement.

Because of the need for rapid access to any one of the many floor mounted microphones installed in both Chambers, the microphone switching panels were laid out according to the floor plan of each area. This was a horse shoe shape, colour coded for ease of operation. The operator could therefore switch on the microphone nearest the Senator or Representative whom he saw rising in his place to speak.

In the House of Representatives the operator and announcer originally shared the control booth but in the Senate there were separate booths for control and announcing.

When broadcasts were in progress, it was necessary to keep the announcer briefed on activities in the Chamber, so a sliding drawer was provided to enable documents to be passed between the Messenger and the announcer.

Operation of the facilities was under the control of Stan Bancroft who later retired as Supervisor of Radio Operations. In 1938, Stan was with the 2CY Canberra installation team



Senate control booth in Federal Parliament 1946.

and remained at the station for six years before transferring to the Sydney studios.

In 1950, a wire recorder was installed in the suite of the President of the Senate and a split of the program being broadcast, provided to enable a recording to be made. Recording equipment installed in the basement to cater for delayed Parliamentary broadcasts included disc and EMI reel-to-reel magnetic tape recording facilities.

The Parliamentary broadcasts were for many years transmitted over 2BL Sydney, 3LO Melbourne, 4QR Brisbane, 5AN Adelaide, 6WF Perth, 7ZR Hobart, 2CN Canberra and 2NC Newcastle. In more recent times a special network has been set up to cater for these broadcasts with transmitters 2PB Sydney, 630 kHz; 2PB Newcastle, 1458 kHz; 2PB Canberra, 1440 kHz; 3PB Melbourne, 1593 kHz; 4PB Brisbane, 936 kHz; 5PB Adelaide, 1539 kHz; 6PB Perth, 585 kHz and 7PB Hobart, 729 kHz.

VIC LE PLA

## BROADCASTING DISTRICT

### SOUTH AUSTRALIAN COUNTRY BROADCASTING DISTRICT SOUTH EAST MAINTENANCE AREA

In January 1992, the South Australian Country Broadcasting District was formed, incorporating three smaller districts. Six staff transferred to the new headquarters in Adelaide but two staff remained in each of the Eyre Peninsula, Spencer Gulf and South East Maintenance Areas.

Mount Burr, the South East maintenance depot, is the centre of a rich agricultural area supporting industries as diverse as winemaking and forestry.

The Coonawarra district is now world famous for fine clarets but struggled with poor prices since its beginning as a fruit colony in 1891, until the full potential of the region was recognised in the 1940's. The original winery has been in the Redman family since 1908 operating under the name Rouge Homme.

Technology has changed the face of agriculture. In most vineyards, large harvesters knock grapes from the vines using vibrating rods but hand picking is still used for some special vines.

Forestry began at Mt Burr in 1879, with plantings including eucalypts, exotic pines and hardwoods. Mt Burr once covered by native scrubland is now surrounded by the single species Pinus Radiata.

Pines once cut with bow saws are now felled by large machines which cut the tree at the base using a scissor action, then trim and saw the log to length. Only the larger trees are still felled by hand using chain saws.

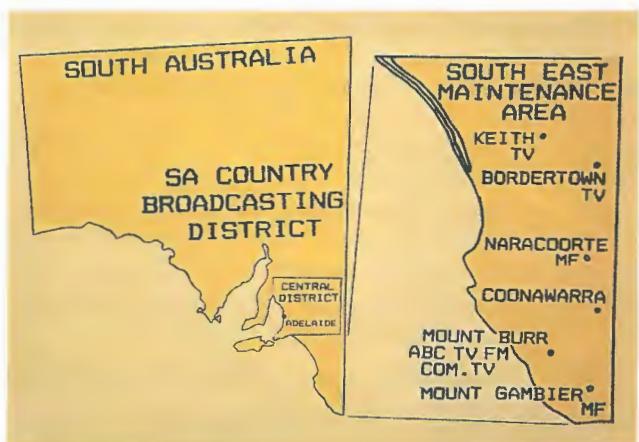
In 1965, television broadcasting in the South East area began from Mt. Burr. The station later became the maintenance centre for the area with remote sites at Mt Gambier, Naracoorte, Bordertown and Keith.

Modernisation of equipment has moved quickly in recent years with NEC TV transmitters at Keith and Bordertown, and a Nautel solid state MF transmitter at Naracoorte. Mt. Burr however, boasts the oldest TV transmitters in South Australia still performing well after more than 27 years.

RON HOLDEN



AWA, Astor and NEC TV transmitters at Mt. Burr.



South East Maintenance Area Map.



MF station 5PA at Naracoorte.



Falling pine trees in the Mt. Burr forest



Machine harvesting grapes at Coonawarra.

## OUR BROADCASTING PIONEERS

### MR C A (CHRIS) COMAS

Christopher Augustus Comas was born on 23 June 1909 at Semaphore, an Adelaide seaside suburb and joined the Postmaster General's Department in Adelaide on 27 June 1924 as a temporary Junior Mechanic at the Telephone Workshops then located at West Terrace.

On 4 June 1925, Chris was appointed as Junior Mechanic-in-training and during the five year course attended the School of Mines as part of the training, as well as receiving on-the-job training in most of the Department's Engineering areas and attending lectures by specialist Departmental Technical Instructors.



*Chris Comas*

During this time, he developed an interest in radio. Broadcasting stations 5CL and 5DN had begun transmissions, and with another, 5KA, being planned there was a great deal of excitement among young boys, many of whom read everything they could find on the new science. There was even a local radio magazine, the South Australian Wireless and Radio Weekly which hit the newsagents every week, and it sold out very quickly. Chris was one of these eager young men who looked forward to each issue and he built many of the receivers described by local experts.

When the Radio Exhibition was held in 1926 in the Adelaide Town Hall, he helped one of the local business houses to set up and man the display. There were some 22 displays on show with 10000 people visiting the Exhibition during the five days it was open. Chris felt very proud in being able to tell visitors to his stand how the latest radio receivers worked, and to advise on the selection of parts for those wishing to build their own receivers.

This enthusiasm with radio was of considerable advantage to Chris because when he completed his training and graduated as Mechanic Grade 2 in 1930, the Department became involved in radio as part of its engineering activities. The Government acquired station 5CL as part of the plan to establish the National Broadcasting Service and when PMG's

Department staff were being canvassed to operate the station, Chris was one of the first to express an interest.

He was appointed to the maintenance staff at 5CL and when work began on the construction of 5CK Crystal Brook, the first regional station in South Australia he was transferred to assist with the installation of the facilities. After commissioning of the station on 15 March 1932, he remained as a member of the maintenance staff.

In 1939, he returned to Adelaide where he was engaged on the operation of 5CL and later, the reconstruction of the ABC Adelaide studios. By this time, he had qualified as Senior Technician, Broadcasting. For a period he was attached to the Transmission Laboratory assisting in the development of program line switching facilities and amplifiers for broadcasting purposes.

During the period 1941 to 1947, he was extremely busy with the installation of high frequency direction finding (HFDF) stations, remote receiving stations, remote transmitting stations, Signals Offices, Public Air Raid Warning systems, VHF radio links and many other activities for the RAAF, Navy and DCA. During the installation of the HFDF station at Mt. Gambier, Chris developed a tool to improve the efficiency of earth mat installations.

It was later used as a standard for carrying out jointing work at other installations throughout Australia. Prior to development of the tool, it was extremely difficult to prevent stray currents entering cables and feeders. These stray currents produced errors in position determination.

An important position he held was Deputy Controller of Air Raid Warnings. In this role, he was responsible for operation of a system which controlled electric sirens and steam whistles in Adelaide, the suburbs and Salisbury Munitions complex. The network was controlled from a central point and was considered to be one of the best in the Southern Hemisphere.

During the War years, Chris held the position of part time Sergeant with 4 L and C Signals.

In 1947, Chris transferred to the Department of Civil Aviation where he was involved in the establishment of the Adelaide Engineering Branch Office, installation of Visual Aural Ranges, Distance Measuring Equipment, radio teletype facilities, receiving and transmitting stations and power plant. Two of the largest projects in which he was involved were the International Transmitting Station near Darwin, and navigation and radiocommunication equipment at Cocos islands in the Indian Ocean.

In 1955, he transferred to the Department of Supply, Weapons Research Establishment at Salisbury, and among his many activities was participation in the Maralinga Atomic Weapons Project which included the establishment of radiocommunication stations in remote areas, radar facilities and establishment of facilities for meteorological stations.

Chris returned to the PMG's Department in 1957, and became involved in a number of broadcasting activities including maintenance of NBS stations throughout South Australian and Northern Territory, inspection of Commercial stations for the Australian Broadcasting Control Board, installation of the Metropolitan Transmitting Centre 5CL/5AN Pimpala, field strength surveys and the Radio Australia, Cox Peninsula complex facilities.

Between the period 1946 and 1964, he acted as Engineer at various levels almost continuously in the PMG, DCA and Supply Departments.

In 1950, he was accepted to the grade Associate Member of the Institution of Radio Engineers, Australia.

On 14 April 1965, Chris took up appointment as Superintendent of Radio in Adelaide, and occupied that position for nine years until his retirement on 21 June 1974. He died in Adelaide on 1 December 1984.

**JACK ROSS**

*The Broadcaster, November 1992 – 7*

## 2KP MACLEAY VALLEY

Station 2KP located at Smithtown, just out of Kempsey on the New South Wales mid north coast, commenced operation in 1954. It employs a pair of STC type 4S55B units each of 5 kW output and connected in parallel. The transmitter feeds into a 168m sectionalised radiator and because the station is situated on a flood plain alongside the Macleay River, the mast base insulator and coupling hut equipment are installed about 2.75 m above the ground. Programs are provided via a local ABC studio located in Kempsey.



Akubra hat factory.

The rich alluvial land of the lower reaches of the Macleay River is ideal for dairying and beef cattle. The principal crops grown in the immediate area are maize and potatoes and a boat trip along the river shows a number of poplar tree plantations in large commercial quantities. Further north at the edge of the service area, are large banana plantations at Coffs Harbour.

A number of industries have been established in the Kempsey area because of its situation almost midway between Sydney and Brisbane. The world famous Akubra hat manufacturers, King Gee clothing, Clark Brickworks, Pyrotechnics fireworks factory and Nestlé Company where Milo is made, are well known landmarks in the district.

Akubra is a family enterprise established in Tasmania in 1882 but moved to Kempsey in 1974. The Akubra hat which is made from rabbit fur is known world wide, and its label has become synonymous with quality and rural Australia.

Milo was developed by Tom Mayne a Nestlé chemist during the Depression years in the early 1930's. It took four years to develop a satisfactory manufacturing process. The difficulty was in finding a process to dry the mixture of condensed milk products, cocoa and milk extract. The product was named after Milon, a champion athlete from the 6th century BC, famous for his feats of strength at the Pythian Games in Greece. Some six million cans of Milo are consumed by Australians every year and it is exported to 11 countries in Asia, to Canada, Africa and Europe. Tom who still lives in the area was 91 years of age last Christmas Day.

RON LEWIS



Elevated coupling hut and radiator base insulator.



Nestlé Australia Ltd Milo Factory.



The Big Banana, Coffs Harbour.

## DESTRUCTIVE INSECTS

Termites have been a major problem to people responsible for the establishment and maintenance of communication facilities, including broadcasting, from early days.

One of the first projects affected was the Overland Telegraph Line constructed between Port Augusta and Darwin during 1871-72. In sections where wooden poles were employed instead of steel poles, termites made a meal of some poles even before the project was completed.



Ralph Denison SD02 and magnetic termite mound.

As the telephone/telegraph/program lines were extended throughout the nation, millions of wooden poles were erected, much to the delight of the hungry termites. By 1936, there were well over 2 1/4 million poles in service requiring a replacement program involving some 90,000 poles per year due to termite damage, dry rot and other causes. Although creosote was extensively used, it did little to deter the voracious termites.

With the advent of broadcasting in the 1920's, termites found another source of food with the erection of support poles for T type aerials, particularly by Commercial stations operators. Poles were either tall poles from the forest or imported sawn Oregon. In addition to solid timber, masts were fabricated using laminated section usually 200 mm by 50 mm bolted together or in some cases, like 5PA Port Pirie, round sections like a flag pole.

Where the masts were erected directly in soil, they did not last long. Termites and dry rot caused havoc. Erectors found the solution was to stand the base on a raised concrete block but even so, regular inspections were necessary to ensure the termites did not build a covered track over the concrete.

Even studios and transmitters were not immune. At Port Moresby in the days when the PMG's Department operated the broadcasting facilities, termites attacked the wooden studio walls. The attack was so vicious that over a period of a few days, a nest built over the inside wooden frame of the double glazed window between Control Room and Studio reduced the viewing area between the rooms by 75%.

Many cases have been recorded of attacks on transmitter wiring, particularly in chases. They appear to have suffered many deaths during the process of gnawing away at high voltage cable insulation, but the queen of the colony produces 2000 eggs a day, so losses due to electrocution were of little consequence. At one RAAF transmitter in Darwin during the War, a 15 wire cable linking the driver and power amplifier stages was completely stripped of insulation, yet the transmitter remained operational until a technician opened the

door of the unit resulting the wires touching and causing a massive arc.

In more recent times, Radio Australia, Shepparton has had its fair share of troubles resulting from termite attack. A great many of the wooden transmission line poles and crossarms have been the source of food for the hungry pest, notwithstanding a concerted preventative maintenance program by local staff.



Typical termite mound in Northern Territory.

At Tumbling Waters, not far from the Radio Australia Cox Peninsula station, there is a large colony of magnetic termite mounds. They are called magnetic or compass termites because people originally thought the termite lined up their mounds with the earth's magnetic field. However, researchers have since determined that the sun is the major factor for the broad surface to face east and west. In the early morning and late afternoon, the sun's rays warm the mound, but in the middle of the day, the rays strike only the top section, which is narrow and thin. Typical height is 3-4 metres with each mound housing up to 200,000 termites. There are about 350 species of termites throughout Australia, with two species being magnetic termites.

The termite, sometime called white ant, is not an ant at all. It is related to the cockroach, whereas the ant is related to the wasp and the bee. Ants have fully developed eyes, while the majority of termites either have rudimentary eyes, or are blind. Also, the termite is soft bodied, while the ant has a hard outer skin. Termites are among the few insects that digest cellulose, the major component of wood.

JACK ROSS/RALPH DENISON

## EARLY PROJECT

### 6WF BROADCASTING STATION

When the Postmaster General's Department took over the A Class broadcasting stations at the time the Government of the day acquired them in 1929, to form the National Broadcasting Service, most of them were outdated technology, and badly in need of updating or even replacement.

The Perth station 6WF was in particularly bad shape. The owner, Westralian Farmers Ltd, had been in financial difficulties due to poor advertising and licence revenues, and consequently maintenance works had suffered. The owner was anxious to be rid of the station as soon as possible, and at its request, the PMG's Department took over the facility on 20 December 1928 even though the licence was not due to expire until 21 July 1929.

Following a detailed study of options, the Department decided that the best way to handle the problem was to provide a new transmitting station at another site in Wanneroo Road with the whole of the engineering, construction and installation work being carried out using Departmental resources. This was the first time the Department had undertaken a project involving the entire design, construction and installation of a medium frequency transmitting station.

Approval to proceed with the project was given on 21 July 1931, and an organisation was set up quickly to commence work. Project leader was R. M. Badenach with the various radio engineering works being handled by R. B. Mair, radio frequency design; E. J. Stewart and H. R. Adam, audio frequency equipment; A. J. McKenzie, power and control circuits; and R. A. Turner and C. Stradwick, drafting services.

The extent of the work was enormous, even by today's standards. More than 107 drawings had to be prepared, many containing intricate construction and design features and all materials had to be purchased through the normal Departmental channels. Most of the major items required the preparation of specifications, calling tenders and assessment of quotations involving considerable resources.

The Research Laboratories and Melbourne Workshops were heavily involved in the project. For some items, the Laboratory staff had to do the design work for manufacturers and carry out acceptance tests on all material received from suppliers. The Workshop staff carried out the construction and assembly of the transmitter and associated equipment with Foreman Mechanic Stan Hosken being in charge. The manufacture of power boards and speech input equipment was completed first and shipped to Perth. On completion of radio frequency stages they were assembled on the floor and tested up to, and including the second power amplifiers, before being sent to the site. The power plant available in Melbourne did not allow testing of the final water cooled transmitting stage. The erection of the towers for the aerial system was done under contract by Johns and Waygood with concrete foundations and all other work being done by Departmental staff. The transmission line was a buried rigid concentric copper tube type of 100 ohms impedance. It was the first time such a line had been used at an MF station in Australia. The aerial system was a multiple tuned flat top type.

The station was cut into service at 8 p.m. on 14 December 1932 with an unmodulated carrier power into the aerial of 3.6 kW giving an overall efficiency of 15%.

The radiated power of the original station in the city, as calculated from field strength measurements, was 650 watts whereas the radiated power of the new station calculated on the same basis, was 2750 watts.

Notwithstanding the complexity of the work at the time, and the logistic problems, the transmitter and associated radiation system was constructed, installed and placed in service within a period of nine months.

DEREK PROSSER



Transmitter building and aerial system as commissioned 1932.



Original transmitter building, now headquarters of Broadcast Lines Group.



Present day transmitter building. In addition to 6WF, building houses 6RN, 6PB and VLW.



The transmitter being assembled in Melbourne, Foreman Mechanic Stan Hosken at bench.



Transmitter installed and operational in Perth.



Staff associated with construction and assembly of transmitter in Melbourne. Project Leader Roy Badenach (4 from L , middle row sitting).

## DECISIONS, DECISIONS, DECISIONS

In 1956, one of my first jobs as a newly recruited broadcasting engineer was to develop a new antenna system for station 2CO Corowa. Since opening in 1931, 2CO has operated with a fine example of the once renowned Alexanderson aerial, a centre fed "flat-top" about 55 metres above ground with the extremities connected back to earth through tuning units. Although this type of antenna is quite efficient, the vertical radiation pattern is broad with the result that self-fading occurs relatively close-in at night due to the interaction of low angle (ground wave) and high angle (sky wave) radiation. Due to the proximity of 2CO to the local aerodrome, aircraft navigation considerations prevented the erection of a normal anti-fading radiator of appropriate height. My initial proposal was for a ring radiator system as originally used at Motala in Sweden. This unusual concept employs a ring of typically 10 short masts plus a centrally placed short mast each independently fed and phased to provide a circular radiation pattern with minimum high angle radiation.

In the days before either the electronic calculator or computer, my design activities on the project took close to a year as I developed and solved the mathematics involved in determining currents, phasing, mast heights and spacing. Having developed the theory, the next task was to design the components and the installation layouts.

No sooner had my plan been developed and costed when the then Australian Broadcasting Control Board decided that State border stations such as 2CO were something of a humbug, particularly as residents of different States (in this case NSW and Victoria) were entitled to quite distinctly different programs. The answer was to shift 2CO further into New South Wales to prevent it providing inappropriate program to the good people of Victoria.

Despite my disappointment at having no opportunity to demonstrate my ring radiator, I embraced the relocation proposal with enthusiasm and was quickly in the field seeking the optimum site. This I eventually located in an area close to The Rock, a small township to the south of Wagga Wagga.

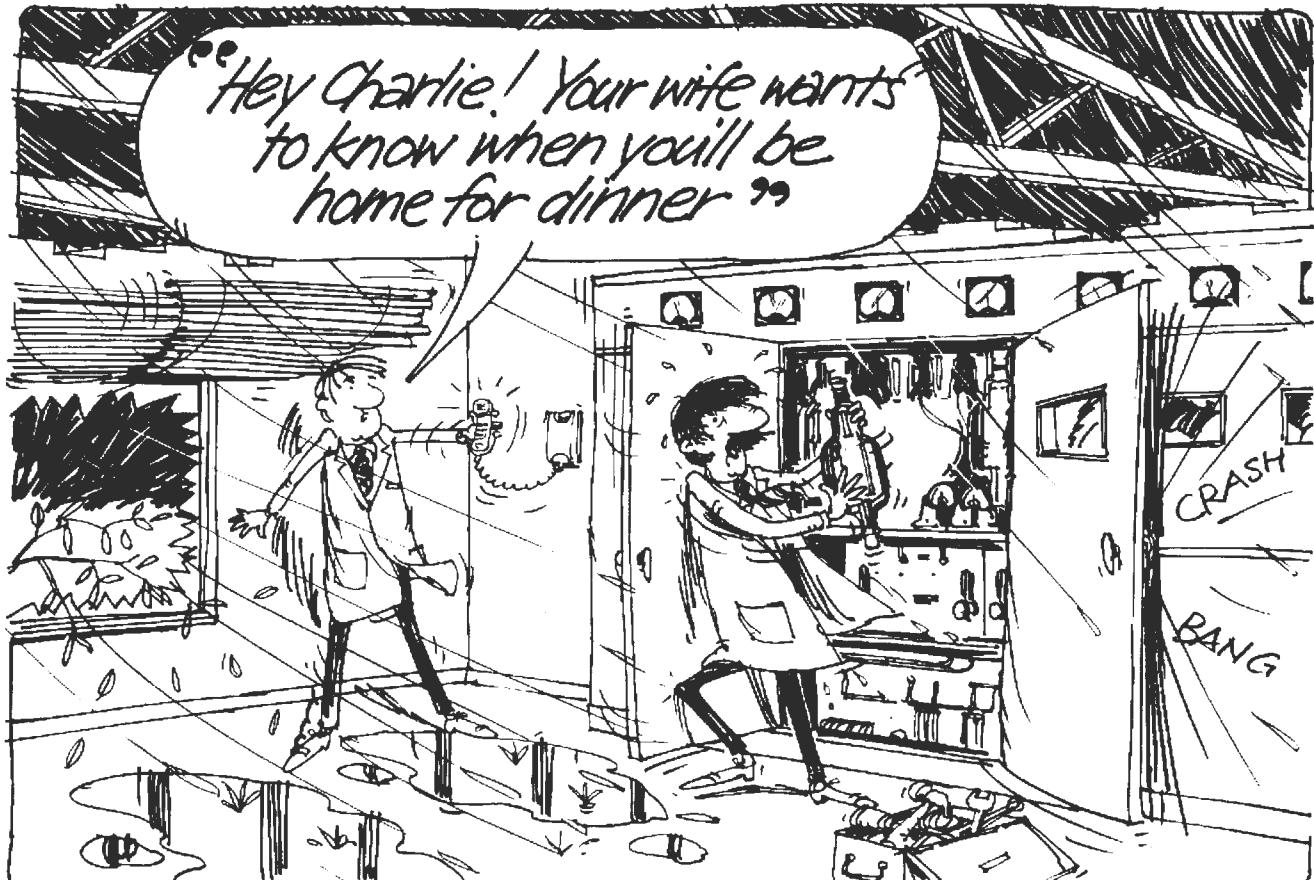
Before the 2CO relocation plan was to receive further attention, electoral considerations led to a determination that Albury/Wodonga should have its own ABC radio station. 2CO limped on at Corowa as we constructed 3AB Albury/Wodonga which, not surprisingly brought with it the same old problems of programming for a service located on common State borders. The solution was obvious. To resolve the problem, what was needed was a new ABC station in Northern Victoria and hence was born 3WA Wangaratta. We then had three overlapping services, 2CO, 3AB and 3WA all carrying much the same ABC program with a gap in coverage to the North of Corowa in the Wagga to Griffith area.

The planners determined to reinstate the relocation of 2CO but not to The Rock. Developments in the interim affecting broadcasting service coverage now indicated that 2CO should best be relocated further North and, in fact, at Ganmain, between Wagga Wagga and Narrandera. By this time the planning rules had changed and it was also now required that 2CO must employ a directional antenna system, thus greatly increasing the cost. A new site was chosen and eventually acquired after considerable negotiation and eventually acquired.

Just a few months ago we received the final edict. 2CO is to be replaced with a FM service operating from Wagga. We are now planning the FM installation which will lead to the demise of 2CO after more than 60 years of operation, mostly from the "wrong location".

It seems hard to believe that in almost 40 years since I joined as an Engineer Class 1, I have been unable to complete my very first assignment - to provide adequate coverage from station 2CO. Oh well, I couldn't satisfy the "planners" perhaps, but I did become General Manager.

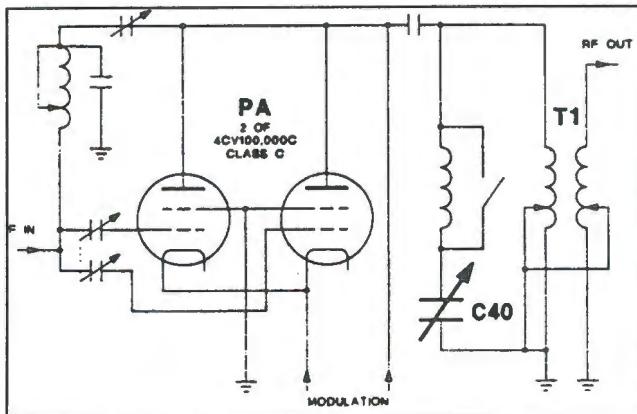
LEON SEBIRE.



## ALTERNATIVE VACUUM CAPACITOR

Contrary to popular belief, not all vacuum capacitors have a long operational life. Operating environments such as high radio frequency voltages and currents, frequent retuning in short wave transmitters and high temperatures all have a major influence on life expectancy.

The three Collins 821A 250 kW transmitters at the Radio Australia Cox Peninsula station each employ a Jennings



Location of C40 in transmitter circuit diagram.

CVTW1600-70X vacuum variable capacitor in the tank circuit designated C40 in the circuit diagram. These capacitors which presently cost \$46000 each have an average life of only 900 hours, with failure being mainly due to fatigue of the internal bellows. The capacitor has a capacity range of 100 to 1600 pF, a peak working voltage capability of 36 kV and maximum RMS current of 1000 amperes. It is water cooled and weighs 62 kg, and because of its position in the transmitter, replacement is a difficult and time consuming exercise. In order to reduce transmitter operating costs, because of the low mean time between failures, investigations were carried out into the use of a cheaper model made by another company. A Comet CV4W 1000E type which has similar electrical characteristics was purchased.

To fit the capacitor into the transmitter, fabrication of adaptors and gearing was necessary but all problems have been overcome and performance is being evaluated with interest. At a cost of \$27000 – a little over half the Jennings cost – considerable savings will accrue should the Comet perform as well, or even better than the Jennings model. Only time will tell.

Although gas filled capacitors were used in high power transmitters for many years, with fixed and variable types being employed, with current ratings up to 500 amperes RMS and voltage ratings up to 95 kV, they are now seldom used in modern transmitter designs. Vacuum technique allows the production of a capacitor of compact size even for high power working. The small size compared with air types result in a reduction of stray capacitance and inductance which can be important in short wave transmitter design. A typical transmitter covering the 7-26 MHz band using an air spaced tuning capacitor would require at least one coil change to cover the whole band but a vacuum capacitor enables continuous tuning over the entire band using only one coil.

In construction, the capacitor plates are in the form of two sets of concentric cylinders, and in a variable unit, their axial positions are controlled by the rotation of a shaft at one end of the capacitor.

DAVID JOSEPH.



Jennings capacitor (L) and the Comet model.



Modified Comet capacitor ready for fitting into the transmitter.

**HELENE PLESSIAS**

Helene Plessias, Human Resources Manager, Vic/Tas Region, commenced work with Telecom Australia in 1976 as a Clerical Assistant at the Toorak Telephone Exchange in the Camberwell District.

In 1977, Helene transferred to the District Office in Prospect Road Camberwell where she worked as assistant to the Supervising Engineer until being promoted as Officer-in-Charge Registry in 1978.

An opportunity occurred in 1979 for transfer to the Human Resources area which Helene found challenging and exceedingly interesting. As a result of her diligent work she received promotions in the area rising to Personnel Officer before leaving in 1985. Camberwell was a very large District employing some 670 people and the challenges and experience obtained in the office were later to be of considerable benefit in other areas. Helene was fortunate to work under an Admin Manager of considerable talents and skill in Human Relations and he was instrumental in ensuring she acquired a solid and indepth training under his tutelage.

In January 1986, she transferred to the Broadcasting Directorate as Personnel Officer and in 1989 was appointed Manager Human Resources. She has a dedicated team in the office and is proud of their achievement.

Outside the office, Helene obtains great satisfaction in designing and creating wedding gowns and when time permits, enjoys travelling with her husband who incidentally works in the travel industry.

*Helene Plessias**Esther Joseph***ESTHER JOSEPH**

Esther Joseph, Executive Assistant in Vic/Tas Region migrated to Australia from Sri Lanka in 1987 and worked in private enterprise in Melbourne for about a year before joining Telecom's Broadcasting Division in 1988 as Administrative Officer 2 reporting directly to the then State Broadcasting Manager.

In May 1990, Esther was promoted to the position of Administrative Officer 3 providing executive assistance to the Regional Manager Vic/Tas Region. Because the Tasmanian broadcasting group is part of the Region, the position involves liaising with staff in Tasmania on a wide range of administrative issues. Other duties involve assessment of priorities to be allocated to incoming correspondence, managing systems for correspondence, travel arrangements, maintaining databases for management information purposes, providing software support whenever her expertise is needed, plus all those other jobs which seem to come out of the blue and for which no one else seems to be responsible.

Although Esther loves to get away to do a few laps at the local swimming pool and perhaps a vigorous workout at the gymnasium, her children Nicola and Gavin are a handful with their extra curricular activities and take up much of her spare time.

**RUTH VIRTH**

Ruth Virth, Administrative Officer 3, Personnel Officer and Senior Clerk, Tasmania Section, Vic/Tas Region joined Telecom Australia in 1979 as Clerk Class 1 in the personnel area of Hobart Operations. She transferred to Engineering Department in 1980 and spent the next three years as a relief Clerk Class 2/3 in both personnel and finance areas.

In 1983, Ruth moved to Burnie Operations in the North West region of Tasmania and was subsequently promoted to Clerk Class 2/3, Staff Clerk. She acted as Assistant Personnel Officer, Clerk Class 4 at Burnie until late 1984 and then transferred back to Hobart.

In 1986, Broadcasting Branch in Tasmania increased the administration group to include the position of Personnel Officer, Clerk Class 4. Ruth joined Broadcasting as Personnel Officer and was permanently promoted to the position in 1987. During the initial period of the position she was involved in the establishment of the Personnel function within the Branch.

In 1989, the position of Personnel Officer was translated to Administrative Officer 3 during the Administrative Officer restructure. To ensure the concept of multi-skilling was followed, the position of Personnel Officer absorbed some finance functions. Ruth performs the positions of Budget Resources Officer and Manager Administration and Finance when the nominal occupants are on leave.

One of the more interesting projects she has been involved with as Personnel Officer has been as an Information Provider during the presentation of the Telecom Superannuation Scheme for Telecom staff in Tasmania.

Ruth has a number of outside interests including netball, reading, current affairs, watching sport, film and music.

*Ruth Virth**Andrea Pearman***ANDREA PEARMAN**

Andrea Pearman, Systems Administrator in the Vic/Tas Region began work in the National Office of the Broadcasting Division as a Contractor in the Operational Support Section for about six months from July 1990, working for Mike Dallimore on a number of engineering software projects and staff training activities. Andrea has a Degree in Computing Science from Monash University and prior to engagement by Telecom had been employed in private industry on a variety of systems works.

About eighteen months ago, a vacancy became available in Vic/Tas Region office and Andrea ceased work in the National Office and transferred to take up the vacant position.

Her activities have encompassed a wide range of computer type functions including user support, staff training, hardware and software support, hardware and software installation and the development of a number of engineering and financial systems used by engineering, technical and administrative staff throughout Victoria and Tasmania.

Andrea has a range of hobbies from which she obtains enjoyment but her favourite is skiing on the mountain slopes during day time followed by a happy get together with friends around a warm fire at night.

## AGGREGATION

### NORTHERN NEW SOUTH WALES

This overview gives some brief details of recent aggregation activities undertaken in the northern part of New South Wales encompassing Mt Sugarloaf, Newcastle; Middle Brother, Port Macquarie; Mt Moombil, Dorrigo; Mt Nardi, Lismore and Mt Dowe, Narrabri.

At all of these sites, there were large scale tower works undertaken, and a total of 22 high power transmitters installed and put into operation within a time frame of 12 months. To say the least, it placed great strain on the State's broadcast-

checking on the progress of the work. With all these people coming and going, the local dummy hire people did a roaring trade.

Each site had its own particular problems in maintaining operations during these difficult times. This involved many switching changes of transmitters and aerials to allow workmen to climb and to work on the towers. There were also sessions after closedown of transmissions for temporary arrangements, to cater for disappearing walls etc. At Mt Nardi where the tower had to be replaced, the new ABC transmitters were installed in the Commercial station building and diplexed into the Commercial aerial. The arrangement required a temporary satellite dish, and the solution of problems which went with such a rush job. At the same time, the



*Crane hoisting material for antenna erection.*

ing resources and it is a credit to all those people involved, that so much was accomplished in so short a time frame.

At a typical site, extensive building works were required, and often included walls being knocked down, and other walls added, the installation of new air conditioning plant and ducts, extension to power generating plant and switchboard, as well as the provision of new coaxial feeders to connect the transmitter to the aerial system. Outside the building, the site was heavily congested with material and machinery associated with activities on the structure.

With all these activities going on, often at a site with little room to move, a typical day would see an army of workmen busily engaged on various projects, and all working against the clock. They would include Linemen, tower contractors, power board contractors, air conditioning workmen, diesel engine installation crews, Commercial station installers and of course, our own installation technical staff. While all this was going on, the local maintenance staff had to ensure transmissions continued with minimum interruption.

The station liaison officer was run off his feet in dealing with, not only the on-site workforce, but the long stream of visitors



*Pouring concrete into one of the tower footings.*

30 year old Marconi transmitters were fired up and maintained transmission for the period of transfer of the new transmitters to their temporary home.

Most of the sites had difficulties with access roads, and in some cases, the trucks transporting the huge rolls of 6 inch feeders needed assistance to complete their journey.

Now, having served their purpose of carrying the feeders to the sites these monstrous drums litter the sites as monuments to the upheaval that prevailed for an agonising 12 months.

Roads were designated with warning signs and flashing lights at some points. Operations staff were pressed into vehicle escort roles, road sign erectors and designers of flashing light units controlled from the station site.

The whole operation was completed without an accident, although there were a few close shave's and a number of breakdowns. But, considering that some 100 truck loads of concrete were required for tower foundations etc., and a continual stream of other vehicles plied the road, we had a dream run.

Photographs in this article were taken by Murray Cooper.

BRIAN ROBB.



*Antenna being prepared for hoisting.*



*Coaxial feeder being set up.*

### THE ABC LOGO

In the early days of television, the ABC had the problem which commercial channels did not have, of padding-out recorded programs with short items to allow program changes to occur exactly on the hour or half hour. There was not a great amount of suitable material available, and live presentation was not always an option. As a result, viewers were subjected to interminable showings of boat trips up the Hawkesbury River and similar items which, after a time lost any appeal they may have had earlier.

Ken Middleton, then Supervising Engineer New South Wales and later Controller of Engineering for the ABC, conceived the idea of using Lissajous figures or waveforms with appropriate background music as an addition to the fill-in material.

Lissajous figures are named after Jules Lissajous a 19th century physicist. A figure is the locus of the resultant displacement of two or more simple periodic motions usually at right angles. They were originally applied to certain experiments in connections with pendulums and sound but later became used for a class of records of this nature produced by the Cathode Ray Oscillograph.

Ken Middleton sought the co-operation of Bill Kennard, then Senior Graphics Designer and John Starr, Senior Engineer New South Wales and they experimented with the telerecording of CRO displays. The video tape era had not yet arrived.

The idea was to produce continuously varying Lissajous figures, pausing at those spots where frequency ratios produced interesting patterns. For a time, the resulting recordings were used as occasional fillers.

In July 1963, the ABC announced that it was about to conduct a competition among its staff for an ABC Symbol and

offered three cash prizes. Judge was to be Mr Hal Missingham, Director of the NSW Art Gallery. It was stated that the symbol was to be used in television productions, letter heads, microphone badges, publications and on vehicles to identify the ABC.

Nearly two years elapsed before the ABC made up its mind on the matter. In May 1965, the General Manager Mr T S Duckmanton said: "Although several entries were of high standard, it was considered that there was no entry which was entirely suitable for the purpose we had in mind."

Since then, the Senior Graphics Designer, Mr W Kennard, has submitted a design which the Commission has agreed we should adopt. The design is part of a waveform on an oscilloscope for measuring frequencies and therefore has relevance for both radio and television".

In commenting on the design, Bill Kennard who had joined the ABC in 1956 after working with BBC Graphics described the symbol as 'crisp, functional and of its age'. He said the symbol had been telerecorded some six years ago but had been put on ice. He chose the three loop wavelength waveform as the most suitable to link the three letters A-B-C.

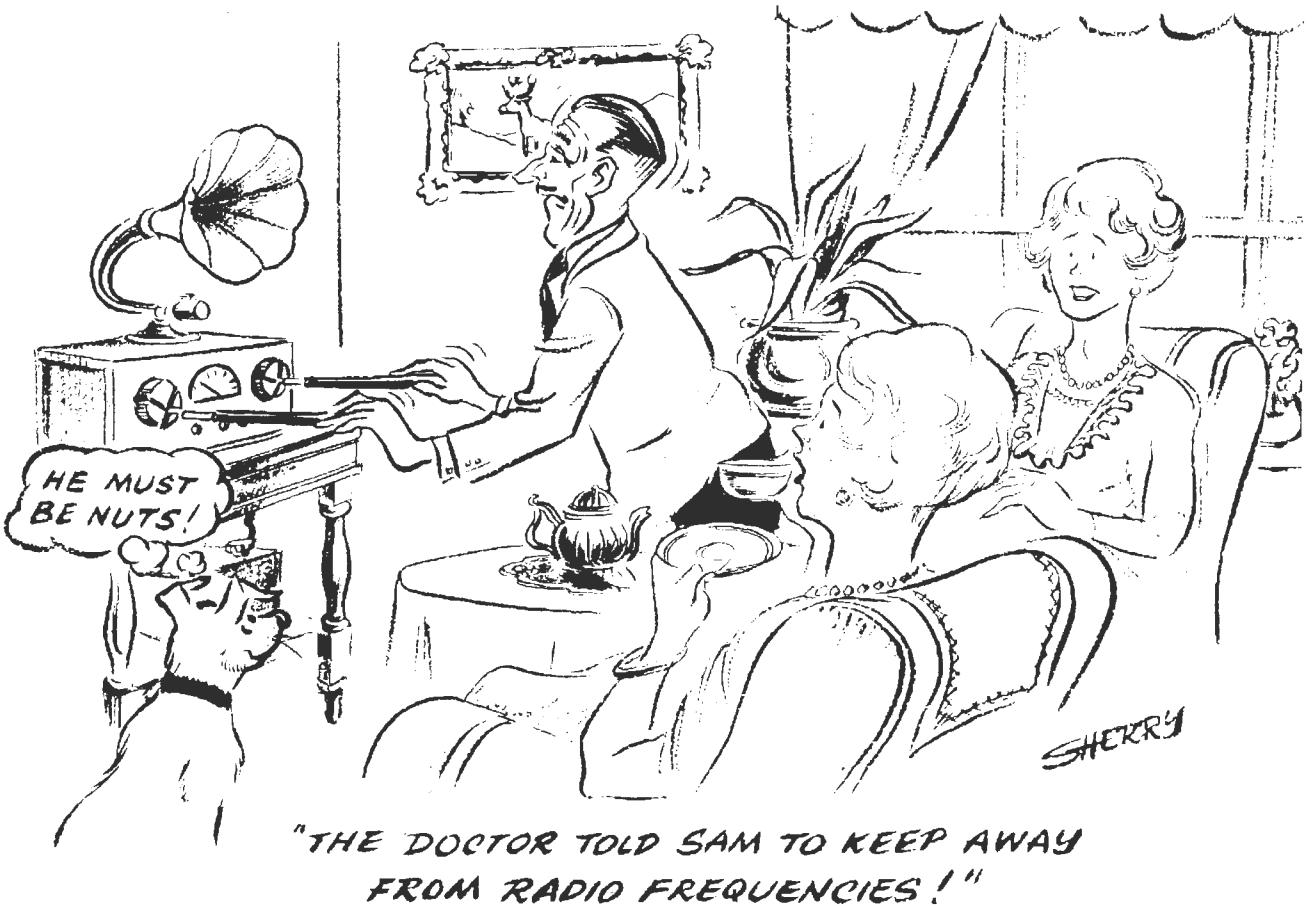
With the coming of colour television, it became evident that the logo needed updating. In 1974, the ABC sought ideas for a new logo. Bob Dickson, a Graphic Designer at Gore Hill, designed a new symbol which needed no background support and could stand on its own as well as being in line with modern graphics trends.

Bernard Terry, Director of Television in commenting on the new design said:

"It is a thickened version of the old one, more suitable for colour. In colour television it will appear sometimes as orange, sometimes blue, sometimes white and sometimes black, most often it will be orange on blue.

Orange represents the sun, and blue the sky, giving abstractions of the Australian country in sun, sky and earth hues. These will become the ABC house colours".

JOHN STARR.



## BROADCASTING CENTRES

### AUTOMATIC CONTROL SYSTEM

The automatic control of broadcasting centres is a matter which has received considerable attention in recent years because of its ability to improve transmission reliability and to reduce station manpower requirements. One such system capable of performing a range of functions is the BROADMASTER developed by ASEA BROWN BOVERI of Switzerland, a company well known to readers of *The Broadcaster*.

BROADMASTER continuously monitors all those parts of the transmitting station of importance for broadcasts, and displays the current status of the complete broadcasting centre with analog and digital values on colour VDUs. Depending on the requirements, messages, data, status and alarms from the most varied ancillary installations which are needed for the complete functioning of a broadcasting centre, can be recorded and monitored.

The control system searches automatically for the appropriate transmitter and suitable antenna, depending on the priority of a particular broadcast and the availability of individual elements. This is done using entries made before hand which the facility checks for their correctness e.g. overlapping of transmissions etc.

In the event of faults or deviations from the planned program, the system will attempt to resolve the problem itself. If this is not possible, the item causing the fault is isolated and marked as defective. The system generates an alarm message and then implements an alternative routing for the transmission using the list of plant items and components available.

By using the facility, the operating staff in broadcasting centres will benefit from a considerable reduction in the workload of one of their main tasks, namely the smooth operation of all the plant and equipment under their control. The most con-

venient version of the BROADMASTER family permits fully automatic operation of the broadcasting station, thus making manual intervention in the transmitting operation unnecessary and thereby catering for the growing trend towards stations being unattended at nights and weekends.

By loading the software onto portable lap-top computers and by using dial-up connections over public telephone networks, managers, maintenance and service crews and standby operators can remain on-line to the station wherever they may be. This calls for an intelligent control and management system able to cope with unexpected events, such as lightning strikes, power failures, program line interruptions and equipment breakdowns. With the help of additional functions such as an optimised reserve material administration and the means of recording and statistically evaluating all main data, there will be a marked reduction in overall operating costs as a result.

Communication between the control system and the operating staff takes place through an interactive process, by which demanding tasks such as transmission planning, can be implemented more easily. Colour monitors, a keyboard and a mouse are available for operating the system. Simple menus, pictures and a digitiser allow direct access to the information required. The appropriate data and pictures – from the selection and processing of alarms to the production of special reports – can all be called up in the simplest manner possible.

Because of its modular software and to its use of commercially available computer hardware, the system can be easily upgraded or extended to cater for later extensions of the broadcasting centre. In its simplest form BROADMASTER is based on a Personal Computer (PC) using a graphic tablet and is eminently suitable for the control of small to medium sized broadcasting stations. By simply adding extra PCs and perhaps larger colour display units, the system can be easily extended to cover the operational needs of the largest centres.

JACK ROSS.



The BROADMASTER control system. (Photo courtesy Asea Brown Boveri)

### FESTIVAL DIARY RADIO

The idea of a fully functioning radio service to complement the Adelaide Festival and Fringe, came about during August 1991 following discussions between the Adelaide Festival Trust and Radio 5UV managements while 5UV was planning its usual comprehensive coverage of both events. The Festival Trust management suggested that a dedicated separate and Festival-oriented radio service was the next logical step.

The Festival Trust successfully applied for a limited broadcast licence from the Australian Broadcasting Tribunal. These are special event licences similar to ones given to the Adelaide Grand Prix for on course commentary. The main difference is one of power. Festival Diary Radio was licensed for 2.5 kW power, comparable with other FM services in Adelaide.



Copy of publicity poster for the station.

Studio facilities were not a problem. Station 5UV had several studios and some program material would go out on both services. Station Manager, Dr Jeff Langdon turned to Telecom Broadcasting for assistance with the transmitting facilities. Many people were involved including Wayne Croft, Paul Salvemini, Murray Fopp, Peter Tsoulos and particularly Greg Kinnear. Broadcasting SA/NT designed the system, carried out the installation and commissioning and wrote advertising for print and radio. Payment for the service was part cash, part advertising space and time.

One of the first activities in the project was to select a suitable site for the transmitter and aerial system. The tallest building in the University grounds in North Terrace looked like a possible site but unfortunately it was clear from an inspection that taller buildings blocked large parts of the coverage area. Negotiations with the owners of the tallest building in Adelaide, the State Bank, led to the discovery of a first class radio-communication transmitter room below the roof. However, there was nowhere to fix a large FM aerial system, so that site had to be rejected also.

The second tallest building in Adelaide is Telecom House, State Headquarters of Telecom, and this appeared as though it might fit the requirements. Jeff Langdon approached Property Services Manager Geoff Walsh who agreed to an on-site meeting. The view was superb with conditions being ideal for the studio-transmitter link, the transmitter and the aerial system.

A 1 kW NEC transmitter was dismantled to get it to the plant level area beneath the roof, and a six metre aerial support pole was carried up in the window cleaning external cage. The pole was later mounted on the cage's lifting frame. The system provided a signal of mixed polarization.

With a few days to spare, Festival Diary Radio was on air covering the metropolitan area of Adelaide. The coverage exceeded the most optimistic expectations. The station was officially opened by the Minister of Arts, Anne Levy. The listeners were happy; the Festival Trust and Fringe were happy, but only the Drafters in Telecom House were not happy – they did not want Festival Diary Radio on their screens!

The station transmitted on a frequency of 101.5 MHz and covered the period 21 February to 22 March 1992, bringing listeners the excitement of the Adelaide Festival and Fringe.

Programming was the responsibility of staff of University of Adelaide station 5UV, Australia's oldest and most established public broadcasting station.

By tuning to Festival Diary Radio listeners were able to find out up-to-date information on Festival and Fringe activities and events including interviews with the stars and the movers and shakers, where to obtain cheap tickets, and a taste of the music they could expect to hear before risking hard earned cash on a ticket. It was claimed to be a cornucopia of information and included regular news updates of local, national and international events, weather reports and regular time calls. People who missed an item of interest, could hear it later on 5UV which also carried most of the Festival Diary Radio programs.

In a publicity sheet advertising its programs, those behind establishment of the station commented;

"The signal is transmitted from 5UV to the top of the Telecom building in Pirie Street via a microwave link. From there it is broadcast with an omnidirectional signal to greater Adelaide."

Telecom was extremely helpful in providing access to their roof – one of the tallest spots in town. Equally, Telecom Broadcasting Division – a little known group within Telecom which is responsible for the installation and maintenance of all ABC and SBS transmitters in Australia – was of great assistance, providing the much needed transmitter. Without Telecom and Telecom Broadcasting there would be no Festival Diary Radio".

Festival Diary Radio was an interesting, challenging team project. From it we achieved publicity, established good relations with another sector of the industry and gained another satisfied customer.

**MURRAY FOPP.**

## LETTERS TO THE EDITOR

Contributors to Letters to the Editor are reminded that full names and addresses must be supplied. Letters should be brief and to the point. Long letters may be edited. The Editor's decision in respect of the suitability of letters for publication in *The Broadcaster* is final and no correspondence on the Editor's decision will be entered into.

Sir,

As a retired Radio Engineer of the former Postmaster General's Department I have been reading with a great deal of interest, articles in *The Broadcaster* concerning the high power Collins, Brown Boveri, Thomson CSF and Harris transmitters installed at several sites in Australia for the Radio Australia service. All these transmitters feature automatic tuning mode, and readers of *The Broadcaster* may be interested to know that 50 years ago this December, while employed with Standard Telephones and Cables Ltd in England, I lodged a Patent Specification concerning, "Improvements in or relating to tuning arrangements for thermionic valve circuits". Basically, the invention concerned an automatic tuning arrangement for high power medium wave and short wave broadcast transmitters. The complete specification was accepted on 13 June 1944, and I was granted British Patent number 561977.

Although equipment forming part of my invention employed electromagnetic devices adapted to vary a reactance forming part of a tunable circuit and controlled directly by a current derived from a thermionic valve or rectifier, may appear outdated by today's solid state technology, it was state-of-the-art technology 50 years ago and like a great many inventions did not receive widespread acceptance and application until many years later. Today, a broadcast transmitter which did not incorporate automatic tuning would not sell. The advantages of a high power short wave transmitter carrying out tuning automatically at high speed are so great that there is now no place for human intervention in transmitter tuning when changing frequency for a new transmission schedule. At the time of lodgement of the specification, I was only 20 years of age having worked in STC's Radio Division for some eighteen months. During my time with the company, I had the good fortune to come into contact with a number of engineers of world standing in radio engineering. They included Eric Willoughby who later became Professor of Electrical Engineering at Adelaide University, and Charles Strong the company Chief Engineer inventor of the grounded grid amplifier and the designer of the 10 kW transmitters provided in 1938 for 2FC, 2CY, 3LO, 3AR and 4QS. Strong prepared the design in England and the transmitters were manufactured in the STC factory in Sydney with modifications to suit local conditions. It was the first time that negative feedback was employed in broadcast transmitters and the first time a transmitter had been manufactured in modular form. Other people included William Macpherson famous for his developmental work on vertical lattice steel radiators and William Earp, Head of Advanced Research and a prolific inventor.

I joined the PMG's Department in Adelaide in 1956 and worked on many interesting projects before retirement 10 years later. Projects which stand out include design and developmental work under Divisional Engineer Jack Ross on single and dual frequency matching networks, mast lighting isolation transformer, transmission line anchor towers and a valve conditioner for 5CL/5AN Pimpala plus insulator end cap design for high power aerials and feeders, high power transmission lines, line feed-through assemblies, RF switch

contacts, corona studies and others for the Radio Australia Cox Peninsula project.

It gives me some satisfaction to know that my contributions added to the advancement of broadcast technology.

BILL GOLD.

Sir,

The Letter to the Editor in the July issue of *The Broadcaster* by John Berry, concerning the 4QL broadcasting facilities at Cramsie near Longreach brought back memories, and readers may be interested in some comments on the facilities provided before the Cramsie site installation.

Except for Dalby on the Darling Downs where 4QS was in operation, there were no MF National Broadcasting Service transmitters operating in inland Queensland prior to the outbreak of the Second World War. All other transmitters were located along the coast.

Although plans had been prepared before the War for establishment of a high power station in the central west of the State, the plans were pigeon holed while the nation went about the business of winning the War.

However, immediately hostilities ceased, action was taken to install a temporary low power transmitter in Longreach.

In 1946, Eric Gough, Senior Technician and Dave Laing, Technician poured three engine blocks in a small galvanised iron shed in the Post Office yard. A somewhat larger fibro-cement sheeted structure was in use as a Line Depot in another part of the yard and two Tasma BC200 transmitters and some equipment racks were placed in an empty section of the building. Staff then returned to Brisbane.

Early in January 1947, Dave Laing and Doug Sanderson, Senior Technician began installation again and were soon joined by Ian Byrnes and Tom Goford. At that stage, the wartime aeradio group was being disbanded and John Talty, Alec Barron and Fred Stewart who had been installing equipment at Longreach airport, were transferred to the PMG's Department and came to assist with the installation of 4QL. Late in January, a Line Party comprising Messrs Robinson, Martin, and Haywood arrived to erect the aerial system. No conventional earth mat could be laid due to the restrictions of the site, so a counterpoise was erected comprising 16 poles about 5.5 m high, with a wire from each converging to an insulated attachment mounted on the main centrally situated steel pipe mast, which was the main support for the L type aerial. This 50 mm diameter pipe was 22 m high, insulated at the base. The counterpoise was earthed at the coupling box which was mounted on the side of the transmitter building.

The transmitters were Australian made by Thom and Smith and used two 813 pentodes in parallel in the output stage. They were obtained from Army disposals and were of a type used extensively with the troops overseas. One of the units had the name Balik Papan written inside, indicating service in Borneo.

Visits by "Snow" Hendry, Supervising Technician Installations, and Arthur Clark, Acting Engineer, were made as the station neared completion, and a week prior to the opening, Ken Bytheway who was to be station OIC arrived in Longreach. Vern Kenna, Divisional Engineer, and Sam Ross, Supervising Engineer, came up for the official opening on 19 March 1947.

The station closed in 1954 with the installation of the new 10 kW transmitter at Cramsie across the Thompson River.

DOUG SANDERSON.

## BROADCASTING MILESTONES

### 2CR CUMNOCK

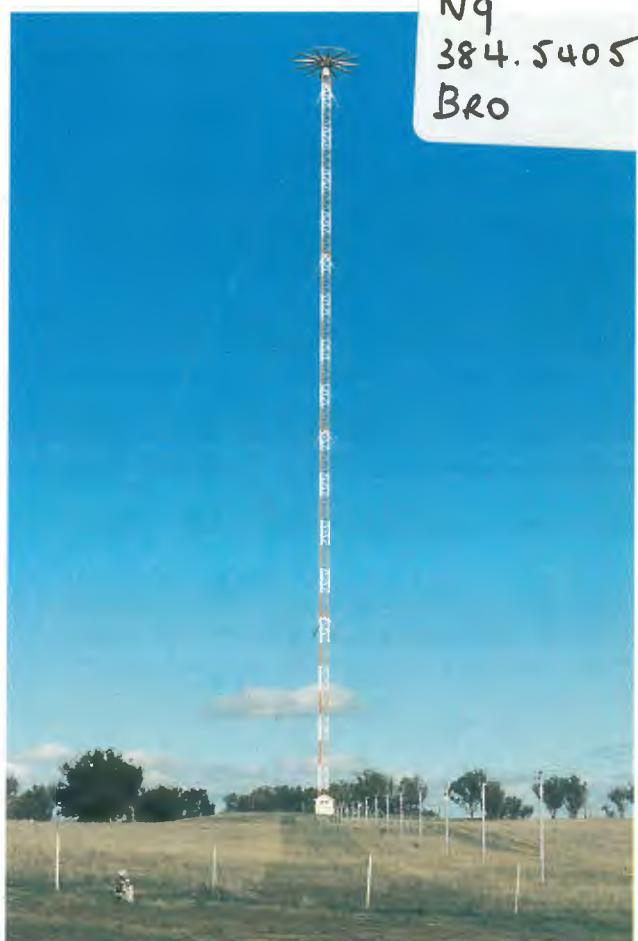
The Central Regional Service, 2CR Cumnock was one of six major MF stations commissioned for the National Broadcasting Service during the mid 1930's. The station was put into operation on 29 April 1937.

A number of important technical innovations were embodied in stations during this period, and for 2CR included a 10 kW transmitter, a new form of radiating mast developed by the PMG's Department with capability for ultimately handling a power input of 60 kW, underground coaxial transmission line, and power generated on site by large diesel engine sets.

The 10 kW transmitter was an upgraded version of an STC 7 kW model installed earlier at a number of NBS stations. The modifications included the provision of four type 4220B water cooled valves operating in parallel push-pull under Class B conditions. The water cooling system and EHT supply were also upgraded as part of the modification work.

Power mains were subsequently extended to the station to allow local generation to cease and for the staff numbers to be reduced. One of the generating units remains today as a standby power source.

Cumnock was among the early stations provided with an armature top radiator. It followed 3WV and 6WA when the 198 m radiator was commissioned. The original underground coaxial line was later replaced by an overhead six wire type. In 1963, a 50 kW AWA BTM50 transmitter was installed. It is still in service and is the only such model in service with the NBS. It operates with an AWA 10 kW BTM10J standby unit. When originally commissioned, the 50 kW transmitter employed English Electric AR63 mercury arc excitrons of a single anode mercury pool type in the main rectifier system. The HT supply circuit was a three phase full wave rectifier



*The 198m armature loaded radiator, operational since 1937.*

employing six rectifiers and associated components. In 1966, the system was converted to solid state rectification using silicon avalanche diodes.

**DAVE TAYLOR**



*The magnificent building, typical of 10kW station designs in the late 1930's.*