

The **BROADCASTER**



Newsletter of the Broadcasting Division

No. 13

March 1989



The Broadcaster is the in-house newsletter of the Broadcasting Division 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:

The Editor,
The Broadcaster,
Telecom Australia,
GPO Box 1621
ADELAIDE SA 5001

Editor: Jack Ross.
Publication Co-ordinator: Mel Pressley.
Design and Layout: Brian Turner
Co-ordinators:

| | |
|---------------------|--|
| Central Office: | John Hodgson, Bill Edwards, Phil Davey. |
| Queensland: | Leo Moloney |
| New South Wales: | Ron Johnson |
| Victoria: | Ray Weeks |
| Tasmania: | Glen Clements |
| South Australia/NT: | Jerome van der Linden |
| Western Australia: | Jeff Keith |
| Published by: | The Broadcasting Division, Telecom Australia 11th Floor 484 St. Kilda Road, MELBOURNE VIC 3004 |

While interviewing one of our retired officers for an article in The Broadcaster I was somewhat surprised to learn of the approaches to cost cutting measures adopted by some of the major home receiver manufacturers in the 1930's.

I was told that one company which produced several hundred console and mantel receivers a week employed one man full-time whose sole purpose was to cut costs on existing production designs. The man could save his annual salary by designing out one capacitor or wire wound resistor, and save the wages of several assembly workers by replacing two single function tubes with one multi-function tube. Such was the production volume in those golden years of radio.

He also told me that the manufacture of domestic radio receivers was one of the very few growth industries during the Depression years.

Wouldn't it be wonderful if we could latch on to that cost saving principle today? Think of it for Radio Australia with transmitting tubes costing \$10,000 each and vacuum capacitors at \$35,000. The mind boggles.

JACK ROSS
Editor.

Front cover:
Telecommunications Tower Black Mountain A.C.T.

Contributors to this issue:
Leon Sebire, Max Chadwick, Doug Sanderson, Vic Audet, Keith Dare, Ken Frost, Col Steel, Brian Beyer, Mark Borgas, Denis Collins, Murray Fopp, Terry Said, Ted McGrath, Terry Price, Graham Ward, Gordon Hall, Colin Kay, Fraser Watson, Jack Ross.

National Library Card No. ISSN 0816-3235.





Leon Sebire

FROM THE DIRECTORS DESK

Since our last issue, I have spent little time at my desk. Three months hospitalisation and recuperation from a heart attack suffered in Sydney during the 1988 Asia-Pacific Broadcasting Conference have provided a diversion.

The volume of messages of goodwill and support was quite overwhelming, hundreds being received including many from overseas as well as from distant parts of Australia. I will not be able to write individually to all who passed on their best wishes and have taken the liberty of misappropriating this column for the purpose of this occasion.

As a long time public servant, one always regards with great reverence those who have the "good fortune" to be **superannuated** before retirement age. I have to admit that I rejected the offer. How could one leave such a fascinating occupation and more importantly, how sad it would be to lose contact with the vast number of good friends one has made in broadcasting over all these years.

On a separate matter, I draw to attention the forthcoming retirement of Don Purdy, State Broadcasting Manager, WA from 31st March. Don and I have been great friends since, in the 1950's as young Radio Engineers, we worked together on an installation project at station 6GF Kalgoorlie. Don was the first SBM WA and has been one of our most dynamic and entrepreneurial managers. I am sure that all of you join me in wishing Don a long and happy retirement and thank him for his very significant contribution to broadcasting development in Western Australia.

We also extend our congratulations to Jack Ross our hard working Editor for being made a Member of the Order of Australia (AM) in the 1989 Australia Day Awards. Jack's award was for past contributions to broadcasting engineering. Well done Jack – we're proud of you.

LEON SEBIRE

ABNS-1 THE BLUFF

National Television Station ABNS-1 is located on The Bluff, a peak some 735m above sea level, in the Southern Flinders Ranges and 16 km from Port Pirie. Being the highest point in the immediate area the view over upper Spencer Gulf and surrounding country is spectacular and for many years the local tourist bodies have requested that the site be opened up for the general public. The construction of the station necessitated the building of a 5 km steep access road through natural bush country.

Major centres covered include the Iron Triangle comprising the cities of Port Pirie, Whyalla and Port Augusta and the mid north and northern agricultural areas of the State.

The station was the first regional television service to be established in South Australia with transmissions commencing on 10th April 1965. The transmitter comprises parallel 10 kW Marconi units.

Commercial station GTS4 with studios in Port Pirie was commissioned on 1st March 1968 with a single 10 kW AWA transmitter in the same building as the National unit and maintained by the local staff under a sharing agreement.

Coverage of both services was extended to Port Lincoln on lower Eyre Peninsula by means of translators at Mt. Olinthus and Borthwick's Hill. Until conversion to Aussat operation Woomera derived its television service from ABNS-1 with an off-air pick-up station north of Port Augusta and thence via a thinline microwave radio relay system to Woomera. UHF translators serving the towns of Quorn and Hawker also derive their program from The Bluff transmitter.

The station is the centre for the Spencer Gulf Broadcasting District with maintenance responsibility for twelve television and sound broadcasting stations. The most distant transmitter is located at Coober Pedy, well known for its opal mining activities, some seven hours driving from The Bluff.

BRIAN BEYER

8DR DARWIN

During the Second World War an amenities broadcasting station with call sign 5DR was established in the Northern Territory for the benefit of Service personnel in the Top End.

In 1946 a decision was made to include the station in the National Broadcasting Service. Building and equipment were recovered and re-installed closer to Darwin. The transmitter and studios were located at Gardens Hill, now known as Blake Street, and a receiving station equipped with rhombic antennas built on the racecourse site.

The transmitter was a modified ex-Army Tasma 200 watt unit feeding a T type antenna. The transmitting equipment was housed in a large corrugated iron building, together with two studios, ABC offices and amenity facilities. A second Tasma transmitter was added in 1947.

The majority of program was generated locally, but news, current affairs and sporting segments were rebroadcast from southern based HF stations. In 1948 a program line was provided between Adelaide and Darwin enabling programs from the Adelaide ABC studios to be broadcast in Darwin.

The program line also served 8AL in Alice Springs and for programs originating in Darwin it was necessary to reverse the line equipment. This was not just a matter of pushing a button at one end of the line. It was necessary to co-ordinate the cross patching of the amplifiers at each of the six intermediate repeater stations as well as at the terminals.

The Tasma transmitters were replaced by twin 2 kW Philips models in 1955 and a 41 m umbrella loaded lattice steel radiator replaced the T antenna. The station call sign was changed to 8DR on 11 July 1960.

In 1965 the station was relocated to a site off Douglas Street and in 1978 twin STC 1 kW transmitters replaced the Philips units.

As a result of experience with Cyclone Tracy in 1974 the building has been substantially reinforced.

MURRAY FOPP

NEW REGIONAL STUDIOS

The Chairman of the Australian Broadcasting Corporation, Mr. Robert Somerville opened new studios in Grey Terrace, Port Pirie on October 20, 1988.

The new studios replaced the original studios established in 1954 in an old bungalow in Gertrude Street. Broadcasting from there was anything but glamorous. The sound-proof studio did not have airconditioning and after successive days of searing heat, the back door had to be left open just for the announcer to survive. This resulted in some programs featuring the sounds of barking dogs, traffic noise and the occasional horn blast from the large overseas ships travelling up the nearby Pirie River.

The studios provide regional radio program to a number of transmitters, with 5CK Crystal Brook being the local transmitter. Station 5CK was commissioned in 1932 and was the first Regional transmitter of the National Broadcasting Service to go to air in South Australia. At the time, it was the most powerful transmitter in the State.

For many years 5CK provided the only National radio service to the north of South Australia and was a welcome contact with the outside world for many people on isolated



New studio facilities. Terry Price at the controls.



The new building

cattle stations, opal miners in dugouts at Coober Pedy, lonely settlers camps strung along the Transcontinental Railway and countless small communities in 89% of the State.

The new air-conditioned studios cost \$1 million to build and ABC Regional Manager, Terry Price, commented that staff moved from 'the worst station in the world to the best outside the capital cities of Australia'.

Former manager of over 20 years standing Bert Rowe was a special guest at the official opening, as were the regional managers of the other regional ABC stations coming under the South Australian umbrella, Mount Gambier's Ian Giles, Broken Hill's John Pickup and Renmark's Don Bensted.

And holding pride of place in the new building is a display of radio memorabilia beautifully restored by former State Broadcasting Manager with Telecom Jack Ross. The display cases were moved from the 5CK transmitter building at Crystal Brook to go on public display in the new ABC building.

TERRY PRICE

UNUSUAL ANTENNA

Although the professional design of receiving antennas requires a considerable knowledge of mathematics and radio physics, many people without such specialised knowledge use their own approach to making an antenna. Many weird and wonderful shapes have been seen in remote areas and they appear to give just as good results in some cases as costly models purchased from radio shops.

The photograph shows a typical locally designed and locally manufactured— if indeed anything had to be manufactured— model in service as a VHF TV antenna at Yuendumu in the Northern Territory.

It is simply a piece of concrete reinforcement mesh found on the dump. The locals couldn't be happier with the performance. Total cost is not known but no doubt a couple of cans were necessary to induce a couple of the citizens to erect it.

MARK BORGAS



Anything will do.

ABU SILVER JUBILEE

Some two hundred and sixty five delegates and observers representing more than fifty broadcasters and allied organisations attended the 25th General Assembly of the Aisa-Pacific Broadcasting Union in Sydney in October 1988. As a principal founding member of the ABU, the Australian Broadcasting Corporation was privileged to host this silver jubilee conference and chose as its venue the Holiday Inn Menzies Hotel where the inaugural General Assembly was convened in 1964.

The late Sir Charles Moses, General Manager of the Australian Broadcasting Commission from November 1935 to January 1963, chaired the first ABU General Assembly and held the post of Secretary-General of the Union from January 1965 to February 1977. In his welcoming address to delegates the present Managing Director of the ABC, Mr. David Hill, referred to the memorable contribution Sir Charles made to the development of broadcasting services in the region. Several other ABC staff members, now retired, who were also present at the 1964 General Assembly and who in subsequent years contributed significantly to the work of the ABU, were welcome guests at a number of the conference sessions this year.

As usual, the Standing Engineering Committee meeting which Director, Leon Sebire and myself were again privileged to attend as members of the ABC delegation, elicited some interesting and informative discussion on a wide range of topics. Of particular interest were those relating to the broader aspects of international regulation on which the representatives of ITU, CCIR, and EBU were able to offer very valuable comments.

In preparation for future world conferences a special working party was established to pursue studies on High Definition Television and the terms of reference for other working parties were amended to reflect the current status of international deliberations on such matters as HF Broadcast Planning and Direct Broadcasting by Satellite.

The next General Assembly will be hosted by Radio and Television of the Peoples Republic of China and is scheduled to be held on Beijing in October 1989.

MAX CHADWICK

CLOSURE 4SO

It was a sad day in December 1988 when 4SO ceased transmission after 36 years service, at the time when tens of thousands of holiday makers were enjoying themselves on the Gold Coast.

The 200 watt Philips 1648 MF transmitter was replaced by a 2kW NEC FM transmitter located high up on the northern end of the Beechmont Plateau, overlooking the coast from Southport to Coolangatta. Initially mono mode, the service will become stereo on completion of a new ABC studio on the Gold Coast.

I remember well how George Barr and I made the site selection tests for 4SO in 1950 with a small transmitter in an old wartime US Army van.

The OIC of the installation was Bill Graham-Wilson, now head of the ABC's Broadcast Technical Department at the Brisbane studios.

Station 4SO was part staffed for the first 10 years and Errol Sutton, Ken Stratton, Chris Jeffrey, Keith Smith and Gerry Elliott served there.

For some years steam radio buffs had hoped that 4SO would be rebuilt with higher power at a new site, but it was not to be.

DOUG SANDERSON.

4QR GOLDEN JUBILEE

Since the inception of broadcasting in Australia in 1923/24, Sydney and Melbourne were provided with a dual service but it was not until the late 1930's that a second National transmitter became available in the other capital cities.

One such transmitter was 4QR Brisbane which was commissioned on 7 January 1938 with a ceremony in the old Belle Vue Hotel in George Street.

The 500 watt STC transmitter was housed on the top floor of the Elizabeth Street Telephone Exchange building. The radiator was a self-supporting steel tower 55 m high with a wire counterpoise on the roof of the building.

During the war years, 4QR was moved out of town to the newly established Metropolitan Radio Centre at Bald Hills where the power was raised to 1 kW and later to 2 kW.

The move was made overnight. After shutdown at 11 p.m. the transmitter was safety key locked. The key turned – and twisted off in the Tech's hands. The OIC of the operation was Arthur Clark, a short tempered man at the best of times. What Arthur said is still remembered by those who were there, but it cannot be printed even 45 years after the event.

In 1947 a new 10 kW water cooled STC A880D unit replaced the original transmitter and carried 4QR program until the installation of a 50 kW STC 4SU-38 model in 1963.

The first 4QR radiator at Bald Hills was an 80m steel pipe.

After 1947 however, 4QR shared a new dual frequency 180m radiator with 4QG and this is still the present situation.

The ABC marked the Jubilee with a broadcast from the Brisbane GPO, and the issue of a special envelope for posting on that day. A brief history of 4QR was printed on the back of the envelope.

DOUG SANDERSON.

CHANNEL CHANGE

The Queensland Broadcasting Branch staff assisted with a major Commercial television operation when channel 0 Brisbane and Channel 10 Darling Downs exchanged channels.

Brisbane staff obtained a recovered SBS transmitter, returned it to Channel 0, installed it in a portable building and moved it to the Commercial site on Mt. Mowbrall. The station management rented the transmitter until the Brisbane Channel 0 units were moved by station staff to the mountain site.

DOUG SANDERSON

WIRELESS RECIPE

The following recipe was prepared by a farmer's wife whose husband is a keen radio experimenter.

Take ten grid leaks, two egg insulators, 500 grams of high frequency currents, a pinch of static and a litre of coil varnish. Choke the cores from the leaks, polarise the egg insulators, insulate the high frequency currents, bypass the static and bleed off the varnish.

Pass the varnish through a screen grid mesh to filter the space charge until there is no resistance and it oscillates at a constant frequency. Beat well in a superheterodyne receiver and ionize for half an hour in a radiator until it is transformed.

Place in an output tank until charged to an ampere turn and serve on a hot plate in a vacuum tube with a sprinkling of electrons.

JACK ROSS

5AN — THE VINEYARDS

Station 5AN was commissioned on the 15 October 1937 and became the second Metropolitan National station in Adelaide. It employed a 500 watt STC transmitter feeding a 62m base insulated tower located on top of a building near the GPO. The station was transferred to Brooklyn Park in 1944 and to Pimpala in 1966. It currently shares a 172m dual frequency radiator with 5CL and operates with a 55kW transmitter.

Areas served by the station include the Barossa Valley, The Adelaide Hills, The Southern Vales and Clare Valley, all well known for their vineyards and wineries.

South Australia produces about 65 per cent of Australia's annual output of wine and is home to most of the major wine companies.

For more than half a century the Barossa Valley has been the heart of Australian red wine production. Here the German Lutheran influence runs deep and strong. Barossa Deutsch is still a living language; leberkässe and salami substitute for fish and chips and oom-pah-pah bands for electric guitars. For three generations the farmers of the Barossa have devoted a large part of their land and working lives to the production of grapes. In recent times, in order to meet changing demand for white wine, unfashionable varieties such as grenache and shiraz are being replaced by rhine riesling.

Companies with considerable investment in the area include Seppelt, Penfolds, Orlando, Yalumba, Wolf Blass, Peter Lehmann Wines and Saltram.

Station 5AN is situated in the heart of the Southern Vales which includes Reynella and McLaren Vale. These districts are truly the home of the small winery in South Australia. Over 40 wineries open their doors to the public every day, most relying on cellar door sales and mail order for their livelihood. The visitor sees such names as Coriole, d'Arenberg, Kay's Amery, Wirra Wirra, Woodstock, Pirramirra and many others.

The Southern Vales once had a fearsome reputation for producing massive red wines, high in alcohol, high in tannin and even seeming to draw iron from the soil. These wines were liberally prescribed by English physicians around the turn of the century because of the medicinal and restorative powers attributed to these uniquely Australian red wines.

Now the wine buff will find a full range of luscious Chardonnay, grassy Sauvignon blanc, soft and mouth filling rhine riesling, richly textured shiraz and cabernet merlot blends with an altogether surprising elegance.

GRAHAM WARD



"ON THE LAKE" Winery and Convention Centre.



Vineyards Taranga Wines.



Wine casks in the cellar Seaview Winery.



5AN building and mast.



Chapel Hill Winery.

BROADCASTING FOR THE PRINT HANDICAPPED

Have you ever given thought to how you would cope with daily life if you were visually handicapped or a quadraplegic who could not hold a book or newspaper or unable to read print because of dyslexia or even if you were illiterate?

One of the leading figures in England actively associated with catering for the needs of the thousands of blind soldiers following the First World War was Captain Ian Fraser. He was a regular broadcaster over the BBC and was the driving force behind the issue of 'The Radio Times' in Braille to enable blind listeners to select programs.

In one of his broadcasts in 1928, he said:

"The ordinary listener enjoys wireless; the blind listener needs it. Broadcasting might have been invented for the blind by a philanthropist who desired to give them the very best thing they could have, so exactly does it meet their need for recreation and instruction. Broadcasting is the blind person's newspaper, entertainer, musician – indeed in every way a Guide, Philosopher and Friend."

Wireless licences were granted free to the blind and indeed this was also the case in Australia until the Government abolished licence fees for broadcast receivers. It has been estimated that 10 per cent of radio listeners are disabled.

In 1974 a number of blind persons in Victoria, along with staff and agencies for the blind, decided to be responsible for the preparation and broadcasting of printed material on public radio. The Radio for the Blind Committee was constituted, and it became a member of the Community Radio Federation.

Various programs were broadcast over 3ZZ and 3CR but arrangements were not entirely satisfactory, particularly after closure of 3ZZ.



Volunteer Panel Operator Marilla Cooper (Courtesy 3RPH).

In 1977 the committee, together with a New South Wales organisation called the 'Sydney Radio Foundation for the Print Handicapped' met with the Minister for Posts and Telecommunications, Mr Tony Staley, and three months later, RPH licences were granted.

The Victorian committee merged into the Radio for the Print Handicapped (Victoria) Co-operative in February 1979. In 1983 an agreement with the Association for the Blind was signed whereby the Association agreed to provide management skills to ensure the continuation of programming, whilst the Co-operative retained the licence and programming policy responsibilities.

Originally 3RPH operated from studios in Prahan on a frequency of 1705 kHz and transmitter with output power of 500 watts. The transmitter was located at Collingwood. The studios are now located at Kooyong and station operating frequency is 1629 kHz.

Station 3RPH 'Radio for the Print Handicapped' is currently one of seven RPH stations throughout Australia broadcasting an information reading service. The station broadcasts seven days a week, and over 400 volunteers support the station. The volunteers maintain a professional standard in production, reading, researching, operating and record maintenance. Program guides are available to listeners in Braille, large print, audio or printed formats.

JACK ROSS



Technical Officer Greg Kaye. (Courtesy 3RPH).



Volunteer Panel Operator Helen Lee. (Courtesy 3RPH).



Volunteer Presenter Jenetta Kerr-Grant. (Courtesy 3RPH).

THE WOLLONGONG PROJECT

The Federal Government's Equalisation Plan is designed to increase the number of commercial TV services available to regional areas of Australia, so that viewers in each region will have the choice of three commercial channels as well as the Australian Broadcasting Corporation and in some cases the Special Broadcasting Service. To accommodate the additional channels it is necessary to utilise the UHF bands, as the VHF bands are already fully occupied in most areas and with some channels such as 4 and 5A being outside the internationally agreed television bands. The Band 2 Clearance program has been initiated to bring Australia into line with these world-wide standards.

Wollongong, the "steel city" in the Illawarra region of NSW, some 80km south of Sydney, has had a commercial transmitter, WIN, on VHF Channel 4 since the early 1960's. After WIN commenced, the SBS started transmission on UHF Channel



UHF National transmitter at installation stage.

59. It was then decided that Wollongong was to become the first all-UHF location in Australia. It necessitated the transfer of the ABC and commercial transmissions to UHF Band 5 with the eventual closure of the VHF transmitters, and under the Equalisation Plan the installation of two more commercial transmitters. These two will carry the programs of the Canberra and Wagga/Orange/Central Western Slopes studios respectively, with local program insertions from studios in Wollongong. All transmissions will emanate from Knight's Hill, the location of the present VHF transmitters, which is southwest of Wollongong near the town of Robertson. The local commercial station WIN is already transmitting on UHF Channel 59, SBS having changed to Channel 53, and the ABC likewise now has UHF transmission using Channel 56.

The two additional commercial services, together with the ABC, SBS and ABC radio FM services, will be at the one location, namely the existing DOTaC site of the ABC VHF transmitters. The present 10kW ABC FM transmitter is being

replaced with a 20kW unit and another FM transmitter to carry the Second Regional Radio Network (SRRN) is to be installed. The ABC UHF transmitter consists of two 15kW units operating in parallel to give 30kW output, and was described in the July edition of THE BROADCASTER.

To accommodate all these additional services, expensive alterations have been necessary to the buildings together with extensions to the upgrading of the mains power supply arrangements with planned enlargement of the emergency diesel generating unit. A 180 metre high guyed mast has been erected attached to which is a large metal gantry as a cable-run to join to the building. On top of the mast the UHF TV and FM broadband antenna arrays will be mounted to cater for up to five UHF services. Instead of conventional aircraft obstruction lights, strobe lighting is to be used.

The ABC and SBS programs are received from AUSSAT via a 4.5 metre diameter dish, but the two commercial services will receive their programs by means of radio bearers from



Newly erected mast alongside original tower.

RamCorp in Wagga with additions from the Prime TV studios in Wollongong, and from CTC7 in Canberra respectively. The extra radio bearer equipment has required rearrangements of the existing equipment which involved the relocation of some of the internal walls of the building, as has the enlarging of the transmitter hall for the commercial transmitters. Concomitant with these changes a program of automatic operation, control and remote monitoring of the ABC and SBS transmissions, and of the status of each transmitter, satellite feed and TV station security alarms has been incorporated. This uses the ACTTS (Automatic Control Testing Telemetry System), which reports to the Monitoring Information Centre in Sydney.

KEN FROST

WIRELESS TELEGRAPHY WESTERN AUSTRALIA

The first wireless telegraph tests in the Colony of Western Australia were conducted by staff of the Telegraph Branch of the General Post Office in order to assess the practicability of establishing communication between the mainland and Rottneest Island.

On 11th October 1899 George P. Stevens, Manager and Electrician of the Telegraph Branch assisted by W. Knox Inspector of Telephones, Mr Phillips, Batteryman and A. G. Rosser, Instrument Fitter of the Mechanical Branch carried out tests to ascertain the distance over which it was possible to signal without wires using the apparatus available.

The apparatus comprised a keyed 15 cm spark coil as transmitter and unexhausted coherers using iron filings as receivers. Suitable facilities were not available to ensure a reliable vacuum for the glass tube in which the iron filings were located. This was unfortunate as expert opinion indicated that the coherer sensitivity would have been enhanced considerably with a vacuum environment for the filings.



George Philip Stevens.

A shore station was established at the Royal Yacht Club with the antenna being attached to the flagstaff. This gave an effective height above water of 12m for the antenna. Other apparatus was installed on a Police launch with a temporary mast being used to support the antenna.

After the launch left the berth communication was established with it up to 190m off shore. The launch was then put under slow steam and the distance from the shore station gradually increased. Communication was maintained right up to the 1240m mark but beyond that point the sensitivity of the coherer was not sufficient to respond to the low signal strength. Despite trials with various lengths of spark from the transmitter, signals could not be received beyond 1240 metres.

When the launch turned round and headed back to shore, the receiving apparatus again responded on reaching the 1240m point. The Morse Code signal could be read easily.

Experiments were also carried out to determine the distance at which communication could be maintained with various heights of antennas. The conclusion was that, other things being equal, the distance over which it was possible to signal varied with the square of the height of the vertical conductors used as antennas. From this it was calculated that in order to establish communication with Rottneest Island from the mainland masts at each station would have to be nearly 70 m high if apparatus similar to that employed with the tests was used.



Mercury coherer.

A problem with the metal filings coherers was that some means was required to decohere the filings after passage of the signal. Various techniques were employed including a vibrating cork which lightly tapped the glass tube container or a rotor wheel which slowly turned the glass tube.

Another coherer used by local experimenters was the Lodge-Muirhead type. It was probably one of the most sensitive coherers made and was known as the disc or revolving coherer. The resistance at coherence was so low that it was generally unnecessary to interpose a relay between the coherer and the recording apparatus.

A small, sharp edged steel wheel about 1 cm diameter just touched the surface of a pool of mercury covered with a thin film of oil. The wheel was adjusted by a micrometer screw so that it could be correctly positioned to just touch the oil film. The wheel was rotated by an external clock work mechanism employing a thin belt drive and insulated wheel.

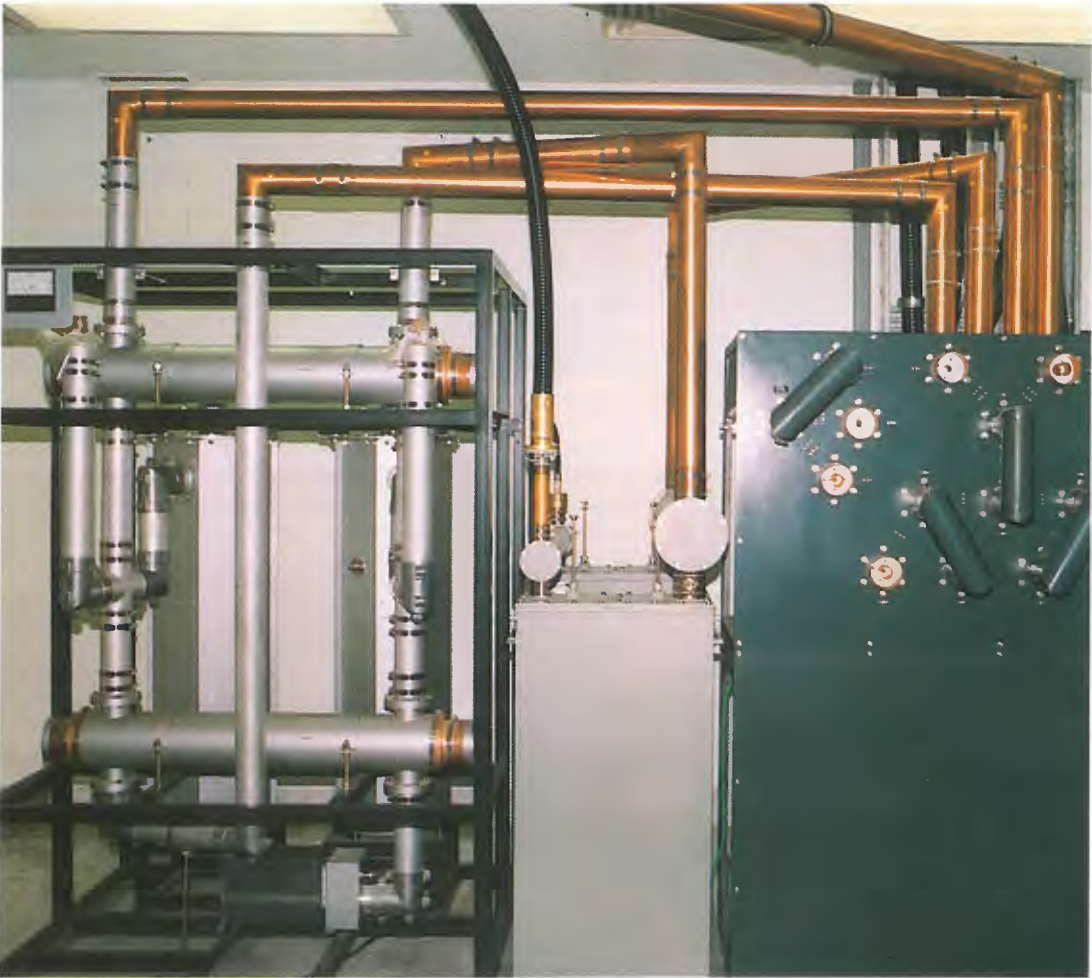
High frequency signals were sufficient to break down the oil film while the continuous rotation of the wheel ensured decoherence as soon as the signal ceased.

One of these coherers brought to South Australia prior to World War 1 by a Western Australia experimenter has been preserved in the Adelaide Telecommunications Museum.

JACK ROSS



ABC-3 transmitter.



Combiners and antenna switching frame

BLACK MOUNTAIN TOWER

BROADCASTING SERVICES

Following the decision to establish a Broadcasting/Telecommunications Tower at Black Mountain in A.C.T., the question remained of whether to shift the existing TV transmitters to the tower for further use or to install new transmitters.

This was resolved after investigations indicated that from an economical viewpoint considered over a 20 year period it would be less costly to provide new transmitters and keep the old ones working in the original location in the interim period.

In the initial phase, the Black Mountain broadcasting complex occupied only the area on the tower ground floor of the tower surrounding the tower shaft and included the control room, VHF television transmitter halls (National and Commercial) and FM transmitter room. The SBS transmitter was later installed in an adjacent area which had been set aside for future broadcasting expansion.

The VHF transmitters are AWA type TVB-10C with an output rating of 12kW peak vision power operating on Channel 3. The two transmitters operate in a parallel arrangement thereby ensuring continuity of service during failure of either transmitter. The associated sound transmitters are frequency modulated and produce 1kW output power. Each vision transmitter comprises signal processing stages, modulators and amplifiers. The transmitter is of a somewhat hybrid design with drive stages manufactured by Marconi, the output cavity is of Philips design and the power supplies manufactured locally by AWA.

The FM transmitter room accommodates a number of FM transmitters including an NEC 9000 series 10kW transmitter for the National FM service.

The first UHF transmitter to be installed in the tower was a 30kW NEC type for the Canberra SBS in 1983. Two separate klystron powered transmitters are used for vision and sound, either being capable of transmitting the combined signals at reduced power in the event of failure of the other. The transmitters are switched on and off remotely from the SBS control room in Sydney. The antenna is a single frequency AEA slotted radiator.

Two antennas, one high band for the Commercial service (CTC-7), the other a low band antenna for the National Television (ABC-3) and FM services are accommodated on the open lattice steel section of the tower above the concrete shaft. This section extends from the 132 metre level to 195 metres above ground level. The antennas are centred at the 163 metre and the 147 metre levels respectively. The antenna panels for both systems were manufactured by Coel, Italy.

With the Government's initiative to introduce "Equalisation of Commercial Television Services" to the country areas it became necessary to provide more extensive UHF facilities at Black Mountain. A Band 4 UHF dual stack antenna of eight levels on four faces was contracted to Radio Frequency Systems for supply and erection. The antenna installation was completed in early 1988.

A report of this installation appeared in the July 1988 issue of "The Broadcaster". This installation was carried out in parallel with the installation of a dual 4 1/8 inch feeder for Commercial FM broadcasters who have since been established in accommodation within the tower.

Two additional Commercial television operators are establishing services at Black Mountain as part of the first phase of "Equalisation" in Approved Market C. Building works and mains power upgrading to accommodate these services have been arranged. A Rotomode UHF combiner, manufactured by Marconi Communications Ltd. will allow up to four 30kW transmitters to operate into the antenna via a Switching Frame which will direct half the total power being fed to the antenna to a dumping load in case of failure in either of the stacks.

VIC AUDET



CTC-7 transmitter (L) and program input equipment.



Program input equipment ABC3 and SBS transmitters.

THE WAVELENGTH CONTROVERSY

When the government agreed to the establishment of broadcasting services in the early 1920's, the plan demanded more than the mere application of overseas experience, as the country presented many special problems in the development of an efficient broadcasting service. There were huge areas, scanty population, wide divergence in climate, broad and sparse primary production and need for encouragement of local personnel and institutions.

Australia too, by reason of its geographic isolation and unified Government, was fortunate in being a continent in which it was still possible to choose an allocation of frequencies on a rational plan. Equipment could largely be designed and installed which would best serve the required areas, without being governed by expediency and without necessity to avoid interference with neighbouring countries. The opportunity existed to devise a broadcasting network on a scientifically planned basis.

The development of long wave technology for radiocommunication had reached an advanced stage by the time a broadcasting system was proposed, and it was natural that designers should turn to the employment of long waves for a new system. Ernest Fisk of AWA had very early in the wireless era recommended the use of long wave transmissions as ideal for Australian conditions. The transmitters built by AWA for the first broadcasting stations were designed for long wave transmission. For example, 6WF commenced transmissions on 1250 metres, 2FC on 1150 metres and 3LO on 1720 metres.

When the Government acquired the A Class stations in 1929 to form the National Broadcasting Service, the Postmaster General's Department was given responsibility for development and operation of the system. The Department also had the responsibility for deciding the broad technical pattern on which both the A and B Class networks should be developed.

By the end of 1932 some progress had been made in the expansion of the NBS to country areas using medium wave transmitters and plans were developed for further expansion.

The Radio Research Board which had become involved in research into broadcast problems concluded that long wavelengths would generally be more suitable for southern States, whereas the PMG Department officers were inclined to favour medium wavelengths.

The Radio Research Board during late 1932 began extensive investigations into the use of long waves, particularly into fading in the 1500 metre band. Using Navy long wave transmitters at Flinders Naval Base in Victoria and Garden Island Sydney, reception tests were carried out in southern NSW and eastern Victoria. The tests successfully filled an important gap in the quantitative information available on long wavelength transmissions. It put a good case for the scientific argument of using long waves in combination with medium wave stations in selected areas.

Arguments by scientific and lay people on long waves versus medium waves for broadcasting purposes continued for a long time. Meeting after meeting resolved nothing, primarily because of hostility between staff of the Radio Research Board and the PMG Research Laboratory.

It was not until the end of 1934 that the PMG Department decided that only medium waves would be employed for the Australian broadcasting network.

A major technical factor influencing the decision was the advent of the half wave vertical radiator which had the important property of emitting only a small proportion of the transmitted energy in a vertical direction. Most of the energy travelled nearly horizontally.

Since long waves would require very tall and expensive radiators of the half wavelength type, they were ruled out as an alternative.

It was thus a simpler procedure to upgrade and supplement the existing medium wave network than to face all the innovations and imponderables inherent in a long wave plus medium wave network.

JACK ROSS



BROADCASTING SERVICES CENTRE SOUTH AUSTRALIA

The responsibilities and activities undertaken by the Broadcasting Services Centre (BSC) are both wide and varied in providing support to the Broadcasting Districts, Engineering and Operations Groups in South Australia and Northern Territory.

BSC's role includes back-up maintenance to the Districts as required, and this may take the form of special projects and modifications beyond the resources of the Districts, repair and changeover service for faulty equipment panels, maintenance and calibration of test equipment, provision of specialised test equipment, provision of specialised test equipment as required, plus the maintenance and stockholding of a wide range of common spare components. In special circumstances BSC provides a limited relief service for the Broadcasting Districts.

To assist in the panel repair role BSC has been provided



Nick Vosnakis (L) and Roger Fitton testing equipment.



Work bench area.

with various types of transmitters and translators, similar to those installed in the field, for use as a source of spare panels and as test beds for repair or in some cases, complete changeover.

BSC also has an Australia wide 'Lead House' role for the panel exchange and repair of NEC 20 kW 7200 and 9200 series FM transmitters. To this end a FBN-7200 E and a FBN-9200 E are installed for use as test beds for repair work and as a resource for spare panels and components. Components and panels have been supplied to almost all States from time to time ranging from small components to main HT transformers weighing approx. 400 kg.

Unlike other States, the Broadcasting Services Centre in South Australia is a combined facility which also incorporates the Construction group under the one OIC.

The Construction group carries out installation and major modifications of FM, MF and HF sound broadcasting and television plant throughout South Australia and Northern Territory. Included in the construction effort is assistance with the preparation of estimates, development of ancillary equipment, co-ordination of equipment supply, performance testing of contract material supplied, documentation and test reports and commissioning of new installations.

TERRY SAID



Instrument store-Eric Koithan (now retired)



Peter Usher (L) and Martin Morris adjusting 20kW NEC FM transmitter.

CENTRAL OFFICE

New staff who recently commenced in Central Office include Gary Kyriacou Works Programming Officer who transferred from Network Engineering in Townsville, Mark Martin from the South Australian Broadcasting Branch and Len Achowicz Supply Officer, Brian Rowland and Cathy Murdoch all from Victoria. In other areas, Graeme Stevens commenced duty with the Development group while Milan Delac from Admin Services and Joseph Raffoul Engineer Class 1 joined John Bray's staff.

Two long serving officers left. They were Kim Ong Engineer Class 2 who retired after 18 years association with broadcasting activities and Charles Slidders who transferred to Network Engineering after 15 years service in various posts in broadcasting.

Frank Tabacco TO1 of the Laboratory died as a result of a recent road accident.

Director Leon Sebire was welcomed back on resuming duties following three months sick leave.

Giff Hatfield recently returned following a nine weeks visit to England, Scandinavia and the United States of America.

During the trip Giff attended the International Broadcasting Convention in Brighton, England at which he presented a paper on radiation levels around broadcasting stations. The paper and subsequent discussions generated a lot of interest among those attending the convention as there is very little information world wide on radiation levels in the near field of antennas.

Giff also took the opportunity to visit the Swedish Institute of Radiation Protection in Stockholm. Their work is of particular interest for the studies they are making on the currents induced at broadcasting frequencies in a realistic model of a human.

During some leisure time, Giff and Alison enjoyed camping in traditional huts and walking in the Norwegian fjord country. While returning home via the USA, they visited some of Giff's old climbing haunts in Yosemite National Park in California.

SOUTH AUSTRALIA/NT

The Radio Lines area has seen a number of recent changes. Bob Westwood and Alois Specht resigned and Ian Tyers transferred to Broadcasting Branch Brisbane.

New starters welcomed include Paul Leahy in Adelaide and Terence Gillis in Darwin. Both are new to Telecom and are settling in quickly. Graeme Mount-Steven transferred from a Darwin Telecom Lines group to the Darwin Radio Lines staff.

Ian Palmer from Darwin Radio Lines transferred to Adelaide as a job swap with Greg Lang at the Brooklyn Park Depot.

In the Adelaide office, Coralie Banks filled in the Works Officers position following Mark Martin's departure to Central Office Broadcasting.

Phil Binns long time 5AN/CL Pimpala staff member and Perc Munchenberg from Broadcasting Service Centre both retired on invalidity grounds.

Les Denison from Radio Australia Darwin resigned to take up a position with the CAA in Perth.

NEW SOUTH WALES

Included in recent promotions in the Branch have been Don Hume advanced as SLO2, Doug Smith to SLO1 and Bill Metclafe to STO1. Well deserved congratulations to you all from all your colleagues. David Stirrup decided to sample another area of Telecom and six staff members said farewell for greener pastures with the outside world. They were Col Henry, Geoff Chadwick, Ken Larkin, Bill Hammill, Ross Foggon and Ric Meins. Best wishes to all in your endeavours.

WESTERN AUSTRALIA

Don Purdy has announced that he will be retiring on 31 March 1989.

John Gregory resigned after 20 years service mostly in Radiocom and Broadcasting areas, Lincoln O'Connor resigned to join OTC, Dave Plecas resigned to work on diesel engines and Alastair Gellatly resigned to join DToc in Canberra.

Mike Dallimore visited Melbour to participate in preparation of tender for Broadcasting work in Samoa.

Natalie Garkin Staff Clerk recently returned from 6 months overseas holiday.

QUEENSLAND

Engineer Peter Brass left the Broadcasting environment to try his hand in another radio discipline. Peter has taken up a permanent position with the Radiocommunications group.

Rhonda Ring, Staff Clerk, retired in November after 21 years service in Telecom. Of this period, Rhonda spent 12 demanding years in Radiocommunications and Broadcasting. A farewell function was held after work, and attended by many well wishers from Broadcasting and other areas.

Doug Sanderson, Senior Engineer and Co-ordinator for The Broadcaster, retired on 7th February after a long and distinguished career with Telecom. Doug had been associated with many radiocommunications and broadcasting projects both in the installation and operation aspects and in more recent times was heavily involved in piecing together the historical record of the National Broadcasting Service in Queensland. All your friends and colleagues wish you all the very best Doug in your retirement.

TASMANIA

Clerks Sonia McKay and Ruth Virth were active participants in opposing summer basket ball teams and much healthy rivalry occurred throughout the season.

AO Glen Clements resumed competitive basket ball despite doomsday predictions of a recurrence of a snapped Achilles Tendon sustained a couple of years ago, doing the same thing.

SLO Brian McKenzie, formerly a Victorian, had decided to become a Tasmanian, having bought a home in Hobart. We're pleased to have you on the Apple Isle, Brian.

VICTORIA

Welcome to the following staff who have joined the Branch recently – Allan Marcou with Drafting, Stephen Clement and Trevor Ward with Engineering Services, Georgette Beis, Richard Nyari and Ann-Maree Niarros with the Management Services Section.

Carl Dillon and Jason Simms have commenced with the Engineering & Construction Section to provide engineering assistance, while Doug McArthur joined the Broadcasting Operations Section as OIC Melbourne and South East District.

Departing from the branch we saw Rodger Berkin and Norm Franke resign to work interstate, while Steve Clement and Harry Dreger decided to join private enterprises. Our best wishes go to these staff as well as to Brian Rowland and Cathy Murdoch on their transfer to Central Office and to Chris de Livera and Harry Lemmens on their promotion to Business Communications South.

TUBE CHANGE

REPLACING HEAVY TUBES

The replacement of heavy or bulky transmitting tubes has been a problem for maintenance staff for many years. The majority of tube failures occur catastrophically after the transmitter has been in operation for some time and hot components make replacement of the tube a difficult and time consuming operation. Some 10 kW transmitter designs of the late 1930's using water cooled tubes employed permanently fitted standby tubes so that a new tube could be put into operation simply by operation of knife switches. Without a standby transmitter this facility was of great assistance to the operator in quick restoration of transmission.

Early transmitting tubes of 1 kW rating and above were mostly water cooled and these were easy to replace except that fracture of the glass to metal seal would sometimes occur unless handled carefully. However when high powers were introduced some of the tubes were massive and easily dam-

aged. and with the 3J261E used in the STC 50 kW transmitters of the late 1950's, the tube weighed only 25 kg even though the output power was very much higher than the massive 3J221E tube.

With present day 250 kW and 300 kW transmitters, vapour phase cooling is employed and tubes operate at boiling water temperatures. Most transmitters have inbuilt features to facilitate tube replacement. The Collins 250 kW transmitter at Darwin uses EIMAC 4CV 100000 tubes which weigh 43 kg. A rail is positioned over the tube to allow attachment of a hand operated winch. The tube is winched out of the boiler, pulled forward and then lowered on to a trolley. The Continental Electronics transmitters used for the Northern Territory high frequency service also use 4CV 100000 tubes and a rail and winch system is used for tube replacement.

With the Thomson 300 kW transmitter at Carnarvon, a slightly different device is used but basically the same principle is employed. A portable hand winch is fixed to a long pipe and operated at about waist level. The other end of the pipe is attached to a lifting eyebolt at the top of the cubicle and the wire rope pulled down for attachment to the tube lifting lug. The



Gordon Hall about to lift Thomson TH573 tube Radio Australia Carnarvon.



Lifting facility Continental Electronics transmitter for tube change. Barrie Morton (R) Mgr NT supervising operations.

aged. One tube used in US transmitters was 1.6 m high and took 90 minutes to replace.

The changeover from water cooled to air cooled tubes in 10 kW transmitters produced tubes of considerable mass. The 3J221E tube used in STC transmitters weighed 81 kg and it took an all out effort by two men to replace the tube until a hydraulically operated cart was developed to assist with the operation.

With improvement in efficiency tube sizes became smaller

tube which is a Thomson type TH573 weighs 24 kg. Average time to replace the tube is 15 minutes but 20 minutes is required for heating the tube before high tension is applied. In the case of the tube used with the 250 kW Brown Boveri transmitter at the same station, a tube change takes 40 minutes before preheating can be applied. After removal of the connector assembly the tube is lifted up out of the boiler by a winch fitted to a permanently fitted rail, pulled forward, and then lowered on to the trolley.

GORDON HALL

JANIS OZOLINS

Janis Ozolins, Supervising Engineer, Engineering and Construction Section, Queensland, joined the Postmaster General's Department in Adelaide as a Cadet Engineer in 1968.

Janis was born in Germany in 1945, of Latvian parents, and came to Australia in 1950. In 1966 he completed a Bachelor of Science Degree (in Physics and Mathematical Physics) and then obtained an Honours Degree in Electrical Engineering in 1969, both from the University of Adelaide.

He commenced work in 1969 with the Radio Section of the PMG's Department and remained in that Section, and subsequently Broadcasting Branch, until his promotion to his present position in Brisbane in 1987. During his time in SA he was promoted from his base position of Engineer Class 1 to Engineer Class 3 and was involved in SA/NT broadcasting installation projects.

Since moving to Brisbane early in 1987, he has been working with other Engineering and Construction Section staff on the demanding tasks of implementation of Equalisation of regional television services and Band 2 clearance throughout Queensland, as well as all other construction projects.

Janis has a 10 year old son living overseas and in his spare time enjoys reading, music, squash, surfing, golf, fishing and renovating houses. He is presently investigating hang gliding and parachuting as other activities.

Included in a number of long term ambitions is to retire as a professional fisherman, to get amongst the tuna and white pointer sharks in the Great Australian Bight.



Janis Ozolins



Greg Duncan

GREG DUNCAN

Greg Duncan, Senior Engineer, Queensland Broadcasting Branch, commenced his engineering career with Telecom in 1978. His initial appointment was with the Queensland Radio Section during which he spent most of his time preparing system designs for low capacity radio telephony systems. Some experience was also gained with broadband microwave system design on several major routes.

In 1980, a then novel project, referred to as the Remote Area Television project, was to be implemented by Telecom. This project employed satellite distribution (using spare capacity on an Intelsat satellite) of television program to low power retransmission sites established in remote areas of Australia. Nineteen such sites were established in Queensland. Greg joined the RATV project team at its inception, and has remained in the Broadcasting arena ever since.

Since RATV, Broadcasting has remained quite volatile on the installation front, and Greg became involved with many installation projects, such as ABC FM stereo for the Darling Downs and Wide Bay, AUSSAT conversion, Brisbane SBS and the Second Regional Radio Network project. Current major projects keeping Greg's attention are Television Equalisation and Band 2 Clearance in Queensland.

On the domestic front, Greg is happily married with two young children, and when time permits enjoys taking his motor boat to nearby estuaries for a few hours fishing in a quiet spot.

DOUG SANDERSON

Doug Sanderson, Engineer Class 3 Engineering and Construction Section, Queensland began his career as a Technician in Training in Brisbane with the Postmaster General's Department. He worked at many centres throughout the State including periods on installation and maintenance at the Brisbane Metropolitan Studios in the days when the Department was responsible for those facilities and later was with the installation teams installing transmitters at Longreach and Clevedon. Doug also spent considerable time on field strength surveys.

Aiming for professional qualifications, Doug qualified as an Engineer through the Trainee Engineer Scheme and since completion of training has been involved in many radiocommunication and broadcasting projects. These include microwave route surveys and designs on Brisbane – Cairns Seacom, Townsville – Camooweal, Rockhampton – Emerald and Dalby – Roma systems together with sound broadcasting and television operations. More recent duties include responsibility for MF, HF and minor TV activities.

Doug recently completed the writing of a history of the National Broadcasting Service in Queensland and Papua New Guinea, and then concentrated his energies towards the establishment of a museum for the preservation and display of broadcast heritage items.

At home Doug and wife Shirley are kept busy with their two children Elizabeth and David together with school and church responsibilities. Doug retired on 7 February and can now concentrate on hobby interests such as coins and stamps, gems and minerals and also short wave listening.



Doug Sanderson



Chris Duffy

CHRIS DUFFY

Chris Duffy ST03, Officer in Charge of ABQ2 Mt. Coot – the Brisbane commenced service with the Postmaster General's Department as a Technician in Training in January 1958. After qualifying as a Technician in December 1962 he was appointed to the ABC Sound Studios Toowoong where he worked for twelve months. He then took up an appointment as Technician, 4QL Longreach in the far west of Queensland where he spent the next three years. During this period he qualified as a Senior Technician, Radio.

In 1967, Chris transferred to Brisbane to work in the installation area and was involved in the installation of sound broadcasting and television equipment throughout the State.

Chris returned to the Operations area in 1977 as STO Television Maintenance where he oversaw the Television Maintenance activities throughout Queensland. In 1984 when the Broadcasting Branch was established he transferred across to a position of STO Technical Expert for the north of the State which he held until his appointment to ABQ2 in January 1986. Since his appointment to ABQ2 he has been actively involved in the establishment of the State's Monitoring and Information Centre as well as controlling the day to day operations of the metropolitan television station.

Chris is married with two teenage sons and this keeps him busy. However, he does manage to find time to include boating, fishing and woodturning as recreational activities.

ENTERPRISE PROJECT

B-MAC EQUIPMENT REPAIR

With the successful launch of Australia's communication satellite (AUSSAT) came the introduction of the Homestead and Community Broadcasting Satellite Service (HACBSS) which uses a transmission technology known as B-MAC and consists of 625 lines B format multiplexed analogue component television system.

B-MAC format is optimised for FM transmission channels as found in satellite broadcasting. Time division multiplexing is used to combine the colour, luminance and digital audio on a line-by-line basis.

The B-MAC system was initially advanced by the Independent Broadcasting Authority in the United Kingdom primarily for use by various organisations to provide a variety of satellite distribution services that may not be intended for reception by the general public. The television transmission technology was optimised by Plessey and Scientific Atlanta in the United Kingdom and Canada for direct-to-home, "pay as you use" satellite television service.

In Australia, HACBSS enables the general public in the rural community to access the Australian Broadcasting Corporation, Commercial television and radio programs free of charge and need only purchase a 1.5 metre satellite dish, low noise converter (LNC) and a satellite receiver which connects to a television set.



B-MAC repair facility. L to R: Colin Kay, Lloyd Jury, Fraser Watson OIC and Tim Gray.

To prevent reception of commercial television and radio programs by metropolitan viewers a type of "conditional access" is employed, this takes the form of "scrambling" the signal to prohibit unauthorised reception. This ensures that advertising by rural commercial networks does not approach on the metropolitan viewing audience. Rural viewers need merely to contact the commercial operator and request that their receiver be authorised. The operator then responds by requesting details as to physical location thus ensuring that the viewer is indeed entitled to receive the service.

Programs distributed by the ABC via HACBSS are not "scrambled" and are intended for reception without restriction by the general public throughout Australia.

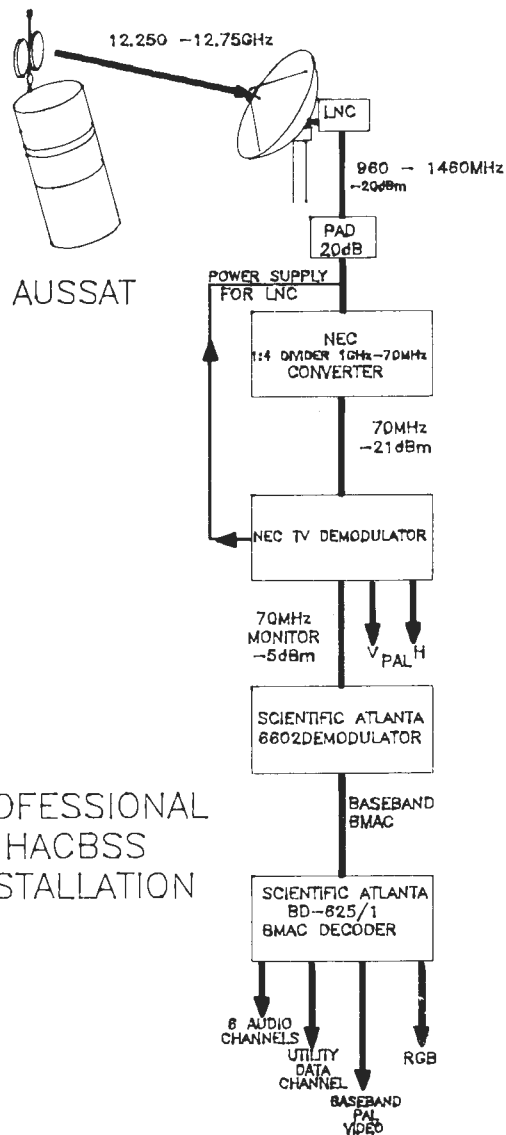
One of the initiatives taken by the Western Australian Broadcasting Branch as a result of Telecom's Vision 2000 program was the establishment of a B-MAC Repair Group whose charter was to "maintain and calibrate B-MAC professional decoders".

A further initiative taken following discussions with Plessey Australia and Scientific Atlanta led to the Branch being granted approval to undertake warranty and non-warranty repairs not only to the Branch's own units, but to commercial and privately owned Plessey/AWA 2001, 2002 and 2003 receivers and associated low noise converters.

The Branch now offers to commercial and domestic clients the same facilities it sought for itself i.e. quick turnaround times, reduced cost and professional standards.

Analysis of Plessey receivers returned to the B-MAC repair facility, indicate that some 75% of units have sustained faults in the base band processor unit (BPU) which is likely, given that the majority of circuitry is contained within this module.

Lightning and power fluctuations continue to be major causes of unit failure. Older Plessey receivers are upgraded as they pass through the B-MAC facility to improve their operation. Included are modifications to the power supply, extension of reset commands to the control microprocessor and upgraded versions of software.



PROFESSIONAL HACBSS INSTALLATION

The greatest cause of failure to Scientific Atlanta professional decoders has been heat related and is compounded by the high density of TTL integrated circuits which generate large amounts of heat. Upgrading of the cooling system both internally and externally has led to a significant improvement in unit reliability. Modifications carried out to the professional decoders include "line 8" luminance suppression which is necessary to prevent flyback lines on some early model television sets and integrated circuit upgrades to improve automatic gain control circuitry.

COLIN KAY/FRASER WATSON

FROM THE BACK ROOM

STO ELECTRICAL

A broadcast transmitter is basically a power converter. It simply changes an input power source from one frequency, usually 50Hz to a much higher frequency, usually in the megahertz range, so that information can be distributed through space. A stable, highly reliable power source is therefore essential for a broadcasting station.

The source is usually provided via commercial mains reticulation, but some of the early broadcasting stations had to generate their own 50Hz power on site. Instances are 4QN Clevedon, 3WV Dooen and 6WA Wagin. This meant that in addition to the transmitter staff, the station included Fitters and Turners, Diesel Mechanics and Electricians.

The only power generating units provided on stations today in Australia are for emergency purposes to maintain transmission in the event of mains failure.

The electrical requirements of a large broadcasting station are considerable and power charges are a major portion of the total station operating cost. As an example, the annual power bill for Radio Australia Darwin amounts to some \$700,000. Circuit breakers and transformers are of huge dimensions to handle the power involved. In addition to dealing with transmitter power requirements in the megawatt range, the STO Electrical has to deal with small stations e.g. TV translators requiring not much more power than a household electric lamp.

In addition to the transmitter function he is responsible for power to all those auxiliary and ancillary functions such as building lighting, air conditioning, refrigerators, water coolers, mast lighting, building security lighting, telex machines and scores of others. There are also large battery installations at some stations.

Fortunately for the STO Electrical, considerable weighting is applied during the planning stage to ensure that the station is erected at the best location or optimum technical performance and power lines are then built to the site. When Guglielmo

Marconi built his massive wireless telegraphy station at Clifden in Ireland in 1907 to establish the world's first point-to-point wireless service, the site for the station was greatly influenced by the supply of fuel to run the steam powered generating equipment. He built the station on a peat bog.

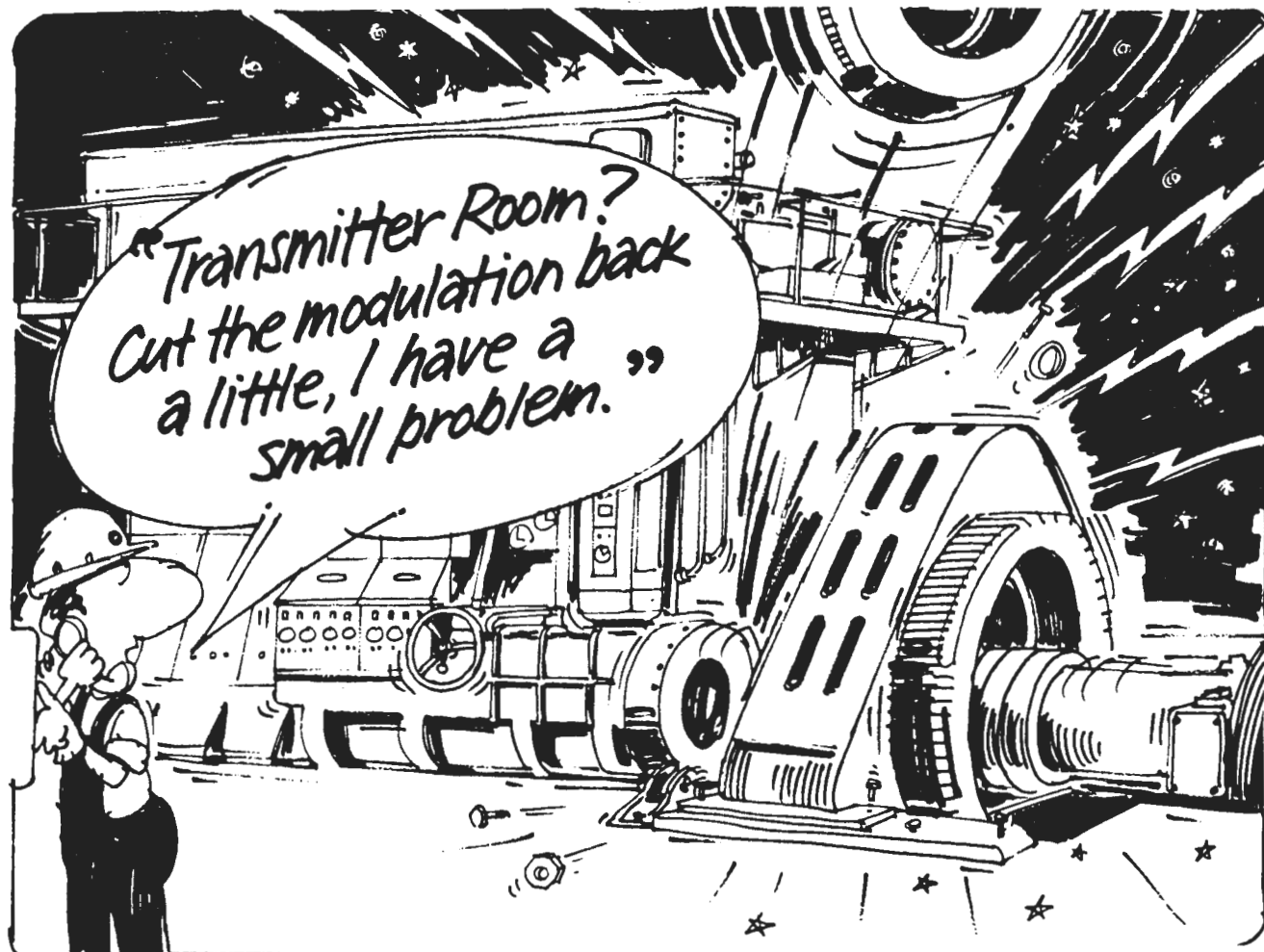
Sound broadcasting and television transmitters impose a fluctuating load on the supply and result in special requirements in relation to regulation and transients not normally required with a domestic load. Sound broadcast MF transmitters are designed to give uniform response at modulation frequencies ranging from 30Hz to 10kHz and television transmitters from zero to about 5 MHz.

At modulation frequencies above the ripple frequency of the smoothing filter for the main rectifier, the filter components are usually large enough to store and release energy without causing any variation of the current drawn from the supply. However, the slower variations of load current resulting from sustained peaks of modulation and periods of light modulation are passed by the filter, causing an irregular rise and fall of terminal voltage.

A mains transformer continuously rated for the load imposed by average modulation would be capable of dealing with the momentary heavy loads incurred at modulation peaks, but allowance must be made for a specified period of sustained modulation when testing, especially in the case of clipped or trapezoidal modulation as used in some Radio Australia transmitters.

The distribution switchboard is another important item where the STO Electrical is involved at a broadcasting station. Switchboards over the years have been flat back types either open or dead front, iron clad type or cubicle type. In Radio Australia installations large circuit breakers are mounted on wheeled trucks to allow the units to be withdrawn from the housing for servicing. In some low power transmitters, the distribution switchgear, contactors and meters may be combined in a power control unit forming part of the transmitter proper.

— DENIS COLLINS



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

When it was announced that the Duke of Gloucester would visit Australia early in 1934, it was thought that he should have some form of entertainment on the long tedious journey from Perth to Adelaide, and to investigate the possibilities, Frank O'Grady who subsequently became Director General and I went to Pt. Augusta via Quorn and took with us the latest car radio receiving equipment which we had modified to work from the batteries on the train. I think it was made by the TASMA people and was very bulky.

The high tension voltage was obtained from a Gene-motor which gave off a continuous high pitched whine when in use.

A special first class coach was put at our disposal at Pt. Augusta and after installing our set-up, we were hooked on to the next West bound train and off we went accompanied by a select group of Commonwealth Railway notables.

We learned later that those responsible for the idea in the first place, now had second thoughts and decided to cancel the project, but we were then half-way to Tarcoola and beyond effective recall.

The locomotives were then coal fired and needed water and coal at about 70 mile intervals which meant frequent stops of considerable duration.

As we went along, Frank and I applied suppression treatment to the various appliances in the coach mostly fans which gave rise to interference to radio reception and when we stopped at Tarcoola for new locomotives, Frank got up on the roof to improve the aerial which was a wire strung along the top side of the coach, while I went underneath to attend to the problems arising from the coach generators.

I made sure that the locomotives were well clear of the train and set to work with my neck lying on the rail as I wrestled with the problem, and, being engrossed in this activity, didn't notice the approach of the new locomotives until a sudden backward lurch of the train moved the nearest wheel to within about six inches of my neck.

Radio reception was mostly from 5CK Crystal Brook and was not particularly good, but the accommodation was good by the current standards, the meals were generous and of top quality, and we had a good time.

We went to sleep on the second night at Hughes and woke in the morning to find we were still at Hughes.

This puzzled us for a while until we saw that we were now travelling East due to our coach having been hooked to the East – bound in the middle of the night at Loongana and we didn't know about it!

In the turn of events, His Royal Highness wasn't at all interested in radio entertainment and the facility was used mainly by members of the Press party to get the latest Melbourne race results.

On our return to Adelaide I installed similar equipment in the South Australian Railways Vice-Regal train for use on trips around South Australia by the Royal Party, and later for many years, by the local Governor.

Ted McGrath
Retired
South Australia

MR. J. (JACK) MEAD

Jack Mead took up duty with the PMG Department as a Broadcast Mechanic in 1940 following twelve months service at the RAAF Base Pearce and five years with the RAAF Reserve. He joined the Broadcast Installation group in Perth and undertook installation work throughout the State.

In 1949 he qualified as an Engineer and became Project Divisional Engineer for expansion of Long Line works between Perth and Adelaide.

Jack changed directions in 1960 and took over a new Radio Division responsible for Broadcast and Radio Telephone installation and maintenance. He participated in the transfer of the NBS studios to the ABC in 1964 with Perth being the first studio to be taken over by the ABC.

In 1965 he became Supervising Engineer Planning and subsequently took over as Supervising Engineer Radio being responsible for all Broadcasting and Radiocommunications activities. In the early 1970's Jack was appointed Superintending Engineer Planning Branch and with the establishment of Telecom and subsequent rearrangements he took over responsibilities of the Regional Operations Branch.

Jack retired in December 1976 and now enjoys travelling to far away places, photography, gardening, playing the electric organ and model railways. In 1976 he was awarded an M.B.E. in recognition of his services to the Youth Movement of the State, particularly Scouting as well as service to the Engineering Profession.

JACK ROSS



Jack Mead



Roy Streeter

MR. R.W. (ROY) STREETER

Roy Streeter enrolled at the Melbourne Technical College in 1933 in a Radio Engineering Course and was awarded a Diploma in 1936. Concurrently with this night study, he was employed as a Junior Technical Assistant at 3KZ Melbourne.

Roy gained a Broadcast Operators Certificate in 1936 and continued with 3KZ until 1938 when he joined the staff as Chief Engineer of 3CS Colac where he was busily engaged in the construction of studio equipment and installation of the transmitter.

In 1941 he joined the Royal Australian Air Force serving in the airborne Radar section with Catalina flying boats at various bases in New Guinea, Queensland and New South Wales.

He was discharged in 1946 and returned to 3CS where he remained until 1957. He then joined the Post Master General's Department as Acting Senior Technician at Tanybryn in the Otway Ranges maintaining the radiocommunication link with Tasmania.

Roy qualified as Senior Technician in 1959 and moved to South Australia where he took up a position of Technical Officer at the new Regional Television station ABGS1 being installed at Mt Burr in the south east of the State. He remained on the operating staff as Shift Leader until his retirement in December 1982.

Since preparation of this article, news has been received that Roy was killed in a motor car accident.

JACK ROSS

2NC NEWCASTLE

When 2NC Newcastle was commissioned on 19 December 1930, it was the first of a chain of regional stations to be erected when the Postmaster General's Department was given the responsibility for establishment of the National Broadcasting Service. It marked the introduction of modern broadcast transmitter technology into Australia.

The station operated on a frequency of 1244.8kHz and an antenna carrier power of 2kW.

The transmitter was manufactured by STC Ltd. and employed a pair of 4228A water cooled tubes in the final amplifier.

The filament, grid bias and plate supply voltages were all obtained from motor generator sets which, with the water circulating pump, were provided in duplicate.

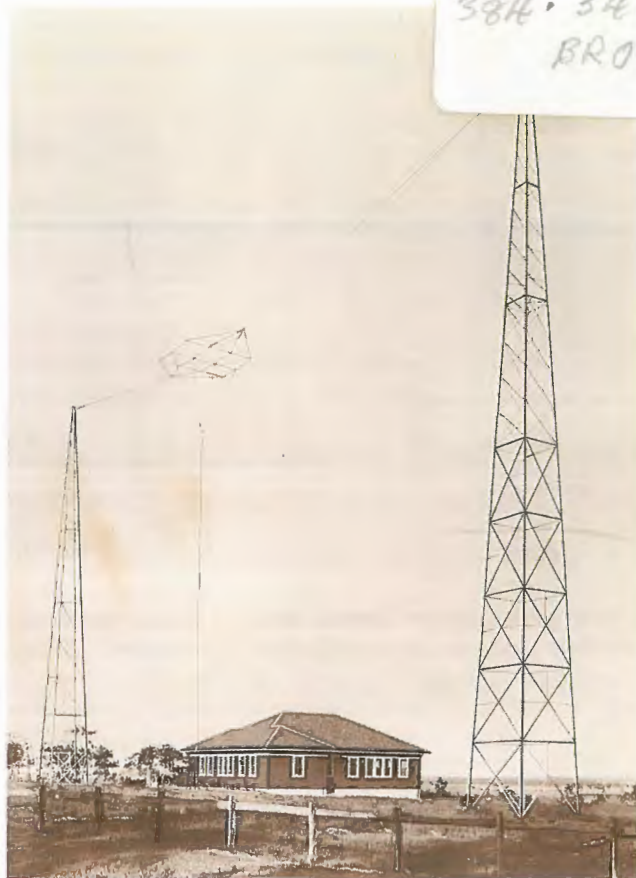
The radiator consisted of a T antenna with a very short flat top and a narrow cage down-lead 100mm in diameter and an extensive buried earth system. The flat top was suspended from two self supporting lattice steel square towers 40m high.

Programs generally originated from the Sydney studios of the ABC using either 2BL or 2FC programs, but two local studios were provided in Newcastle for the broadcast of locally originated programs.

The first OIC was Bill Robinson who spent only a few years at 2NC before going to 2UE Sydney where he was Chief Engineer for many years, was Mayor of Hurstville and in later years, consultant to OTC.

The transmitter shares the site with 2NA which went to air in 1943.

Both transmitters were upgraded to 10kW and a new top loaded mast put into service in early 1959. Two inverted 'L' standby antennas were also provided with one 2kW standby transmitter, with a second 2kW being installed in the late sixties.



2NC 1930.

On 24.8.1975, 2NC began 24 hour operation broadcasting the ABC Sydney rock station program between midnight and 5.00 a.m.

– Keith Dare and Col Steel



Present 10kW transmitter.